Chemical Week

March 29, 1952

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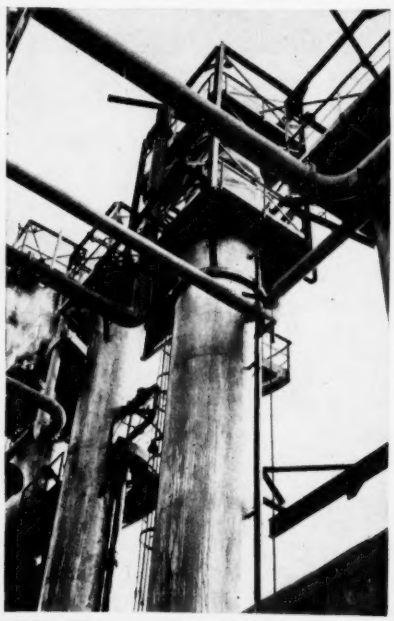

Dyemakers reeling from triple trouble: textile slump; loss of exports; torrent of imports . p. 13

Rystan's Ryan: His patent provokes squabbles, but the chlorophyll industry barrels along . . . p. 31

Threat to antibiotics? Detergents also fatten hogs faster; but the market's still remote . . . . p. 39

More makers elbow into ethylene oxide and glycol; the lures: antifreeze, synthetic fibers . p. 54

Popcorn for packaging comes back; new denaturants win Food & Drug approval . . . p. 57

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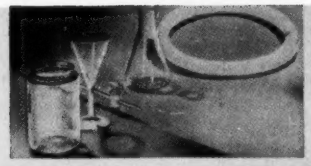

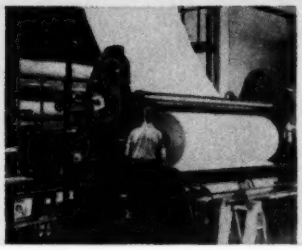

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Chemical Week

Volume 70 Number 13

March 29, 1952

OPINION	2
NEWSLETTER	7
BUSINESS & INDUSTRY	11
SPECIALTIES	25
DISTRIBUTION	31
RESEARCH	35
PRODUCTION	39
BOOKS	42
MEETINGS	42
MARKETS	45
BOOKLETS	52

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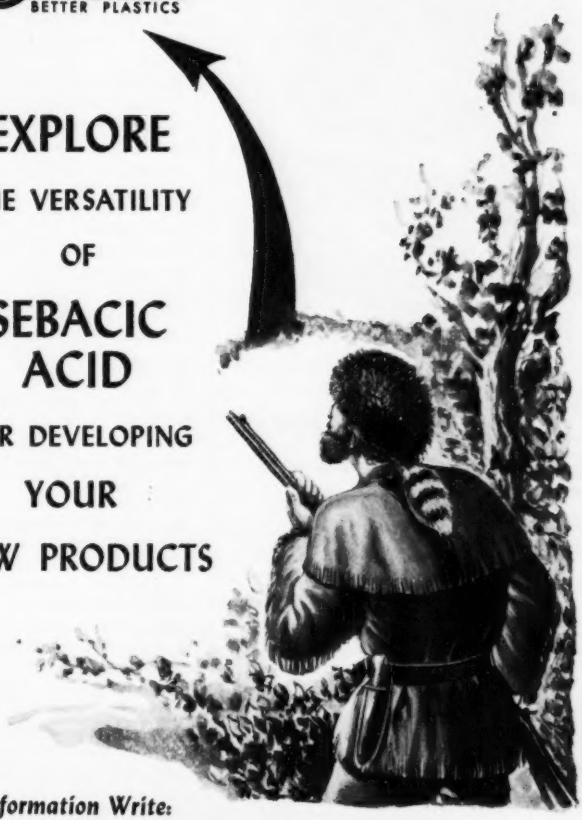

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OPINION . . . . .

Bad Bargain For Everyone

By this week it is ominously clear that something new is being thrust into collective bargaining negotiations. The "union shop" is now obviously the top target of all labor unions; a new factor, "endorsement" by the Federal government, is the ram unions will use to drive the union-shop clause into every labor contract.

Wage issues, naturally, have attracted a lot of attention, have sprung into a hundred newspaper headlines. As yet, however, the significance of union shop demands has been largely overlooked. And strangely so. For even a dollar-an-hour wage boost would be of relatively trifling consequence compared with an arrangement which would, in effect, force thousands of workers to join and support a private organization completely against their will just so that they might hold their jobs. If that were to come to pass it would scuttle, beyond any question, no mean measure of our prized (and hard-won) political and economic freedom.

The union shop *per se* is not, of course, new. Three-fifths of the nation's 16 million organized workers are covered by union shop agreements. (In chemical manufacture 32% of the workers covered by some 2,600 contracts are bound by the union shop. In the food industries the score is 59%, in textiles 66%.) But heretofore these contracts have been worked out by free collective bargaining. What is new—and frighteningly new—is Government endorsement of the union-shop policy. A Presidential Board has already recommended it for the 17 railroad unions and the prospects are that the Wage Stabilization Board will move along in favor of such practice in future industry negotiations.

It is true, of course, that neither the Presidential Emergency Board nor the WSB has the power to order the union shop. But it is also equally true that the favorable recommendation of either of these agencies can be rather easily exploited. In a strike, it's simple indeed to "hold up the hand of government" and impart thereby to a mere recommendation much of the weight of a formal decree. A "recommendation" thus becomes for all practical purposes a government action to sponsor the extension of the union shop, to impose it upon all industry, all workers.

Labor leaders argue that in asking the government to back their union shop aims, they are just trying to maintain the strength of unions, to protect them from being decimated by groups unsympathetic with them, to help them solve the problem of the non-contributing "free riders" who enjoy the benefits of unionization and also enjoy not paying dues. Possibly those are the reasons. Nonetheless, unions have grown lustily over the past decade—a fact which suggests that the dangers of membership erosion on which labor leaders dwell borders on the imaginary.

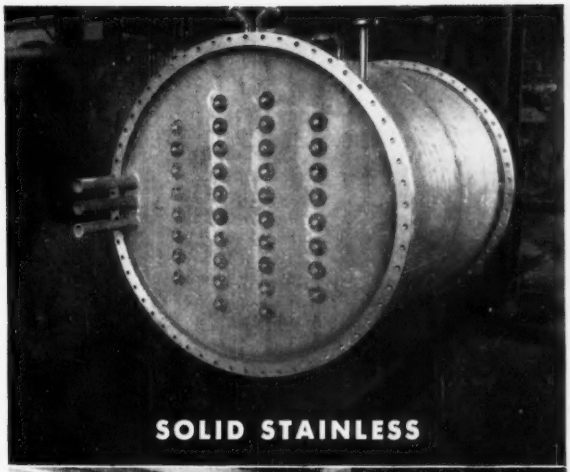
Closer to the truth, perhaps, is that the labor leaders are enthusiastic for the union shop because it relieves them of the problem—and expense—of recruiting members. Too, when coupled with the "check off," as it usually is, it spares them the chore of collecting dues. It makes the unions' job a lot easier. Quite possibly, however, these same union leaders are succumbing to the lure of easier jobs and short-sightedly are overlooking the dangers inherent to government sponsorship.

If the union shop is won through the sponsorship of government it is a bad bargain for everyone. Forcing any citizen to join an organization not necessarily of his own choice is a mighty dangerous activity for the state to indulge in. It would mean, for instance, that the government would be in the position of requiring Republicans, as a condition of employment, to help finance "educational" activities (like the CIO political action committees) designed to keep Democrats in power. And, perhaps at some time in the future, vice versa. In either event there is only one technically correct term for it: tyranny.

Unions stand to lose much more than they gain: The first step is getting the government to sponsor the union shop. The next step, which would inevitably become necessary to avoid validating or compounding the charge of tyranny, is regulation by the government of the union to which it granted the union shop stamp of approval.

That it might not come about immediately goes without saying. But, sooner or later, there would have to be federal regulation to protect the minority forced into the union against its will and to protect the public against abuse of the private monopoly power which the government has sponsored. Free trade unionism is, in its drive for union shop "victory," inviting eventual self-defeat.

It is therefore, in our opinion, unwise for the WSB or other federal agencies to become a party to union shop endorsement; it is unwise for unions themselves to solicit such sponsor-



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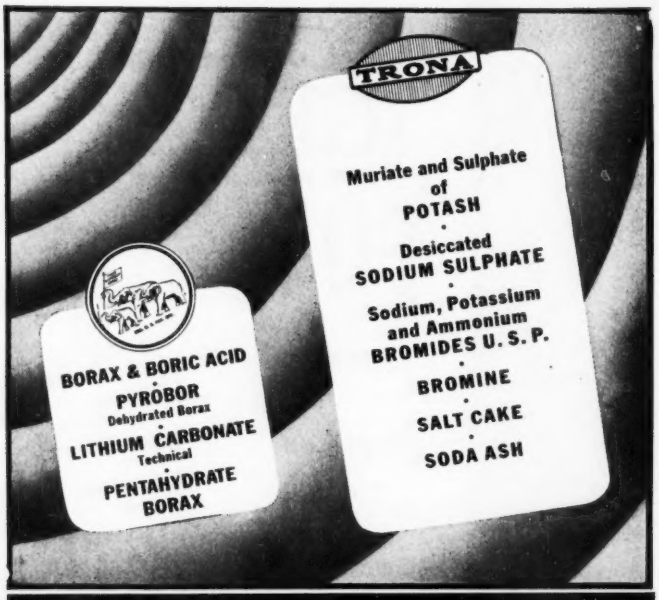

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OPINION . . . . . .

ship of their objectives; it is unwise . . correspondingly, for any businessman to sign such agreements—if it is primarily at the behest of a government agency. But if he must submit to pressures, he should do what is necessary to make it clear to everyone that there is nothing voluntary about his action.

It is inconsistent and unthinkable for us—business men, unionized and unorganized workers—to rush to arm ourselves to fight for freedom abroad, yet casually to let no mean measure of that freedom be crushed right here at home.

—**W. Alec Jordan,** *Editor*

Stinking Business

To The Editor: . . . Your news article "The Why Can Wait" (Mar. 15) which discusses odor research prompts me to write to you . . .

There is no question whatsoever that odor is today one of the hottest subjects in industrial research . . . Several years ago at the insistence and with the aid of one of the military establishments we established and trained a sensory panel which since then has been engaged in some very interesting work.

The assignments have ranged "all over the lot" from routine to some that have been so unusual and frankly unpleasant that great difficulty has been experienced in retaining the interest of the panel participants.

From the amount of work being done along these lines we expect results of more than casual interest . . .

S. F. Coneybear
Vice President
Evans Research & Development Corp.
New York, N. Y.

Both Pros and Cons

To The Editor: . . . I have just read your news article on the St. Lawrence Seaway (Feb. 16) . . . . You have done a very good job of setting up the pros and cons of the situation. . . .

John E. Burton
Chairman
The Power Authority of the State of New York
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CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

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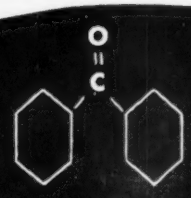
benzophenone



BENZOPHENONE (diphenyl ketone) is an intriguing intermediate with an active carbonyl group connecting two phenyl groups. Its use in perfumes is well known, but its potential in synthesis may still be exploited. It has been suggested as an intermediate for certain antihistaminics, hypnotics and other pharmaceuticals; insecticides; dielectric media; and as a gas absorbing medium.

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melting point	● 46.5° — 48.5° C.
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Typical reactions of BENZOPHENONE

$RCH_2MgX + C_6H_5COC_6H_5 \xrightarrow{H_2O} (C_6H_5)_2C(OH)CH_2R + MgX(OH)$

Grignard compound → Substituted Benzhydrol

$XCRHCOOC_2H_5 + H_2 + C_6H_5COC_6H_5 \xrightarrow{\text{catalyst}} (C_6H_5)_2C(OH)CRHCOOC_2H_5 + HX$

Subst. haloacid ester → ethyl 3-hydroxy-3, 3-diphenyl-2-subst. propionate

$H_2 + C_6H_5COC_6H_5 \xrightarrow{\text{catalyst}} (C_6H_5)_2CHOH$

benzhydrol

In the reduction, other products may be obtained by varying the conditions.

$H_2O_2 + C_6H_5COC_6H_5 \longrightarrow C_6H_5COOC_6H_5 + H_2O$

hydrogen peroxide → phenyl benzoate

$CO_2 + H_2 + C_6H_5COC_6H_5 \xrightarrow{Na} (C_6H_5)_2C(OH)COOH$

benzilic acid

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BUSINESS MAGAZINE OF THE CHEMICAL PROCESS INDUSTRIES

NEWSLETTER

The Atomic Energy Commission is staggering from a one-two punch. First punch, from former AEC research head Pitzer (*CW* Newsletter, Mar. 15), was aimed at the Commission's policies.

Second punch, delivered last week by Congressman Albert Thomas, Chairman of the House's Appropriations Subcommittee, hit at AEC extravagance. He charged that AEC is the most wasteful of all governmental bodies.

His blow was the more painful, for it hit the solar plexus—money. The House listened, upheld the committee's $174 million slash of AEC funds.

AEC is also having trouble with the citizens of Jefferson County, Kentucky (northeast of Louisville), which it is considering as an atomic installation site.

Industries and commerce groups are protesting. Their fear: An atom plant would create shortages of electric power, skilled labor.

Expansion of coal tar chemicals has DPA's nod of approval. Looking forward one to three years hence, DPA wants naphthalene capacity boosted to 555 million lbs.—a hefty 58% over January '51; quinoline, up a whopping 416%, to 5.8 million lbs. by 1955; maleic anhydride, to 49 million lbs., also by 1955—an 80% jump over 1951; anthraquinone vat dyes, to 48 million lbs. next year—a 30% increase in two years; and resorcinol, 10 million lbs. by 1954.

Enough applications for certificates of necessity have been received to meet—if companies act upon them—the goals for naphthalene, maleic, and vat dyes. Planned quinoline expansions fall 2½ million lbs. short, however, and current resorcinol projects are 2.16 million lbs. shy.

Whether you measure it by number and dollar value of certificates (see p. 20) or by expansion projects for which materials have been allotted by DPA, the chemical and allied industries come second only to steel.

By the latter criterion, allotment-granted chemical projects outnumber iron and steel projects 380 to 285, but cost of the steel facilities is $2.2 billion against chemicals' $1.5 billion.

Titanium Metals (Allegheny Ludlum-National Lead) is keeping up to its timetable for titanium sponge production at Henderson, Nev.

The enterprise is now turning out a ton a day, expects to be up to four tons a day by June and ten tons a day by year's end. It's a good bet that Du Pont's output is marching along on about the same schedule with about the same year's-end goal.

If Kentucky smokers of Kool cigarettes examine their packs carefully, they may notice that the familiar cellophane has been replaced by Pliofilm chlorinated rubber film.

Brown & Williamson Tobacco Co. is working with Goodyear Tire &

Rubber Co. to develop this Pliofilm application. So far it's only experimental.

Pliofilm's strong points: better moisture retention, less absorption of outside odors and flavors, excellent heat sealing. Drawbacks: higher cost at present, tackiness, slightly yellowish, tears raggedly; but many of these are minor or can be corrected.

Double helping hand from the Government is putting Shea Chemical Corp. into the phosphate business near Columbia, Tenn.

The firm is now building an electric furnace smelter, will produce dicalcium phosphate, a livestock feed supplement, by a TVA-developed process. Company representatives were given technical data, engineering drawings, royalty-free patent licenses by TVA to operate the process.

A large chunk of the capital comes from RFC, which gave Shea a $2.1 million loan—one of RFC's largest to a chemical firm—upon recommendation of the Department of Agriculture (*CW*, Feb. 16).

More news about phosphates comes from Chemical Construction Corp. Chemico is developing methods for making triple superphosphate in conventional single superphosphate equipment.

It is also designing equipment whereby Texas City Chemical Co. will make dicalcium phosphate from spent sulfuric acid.

General Chemical Division is going far afield to cover itself on sulfuric acid raw materials. It has just bought Piscataquis Iron Works Corp., Bangor, Me., which owns, among other resources, a pyrrhotite deposit which General has been leasing.

Here's one expansion that was nipped in the bud: National Distillers Chemical Corp. has stopped construction of additional sodium capacity at Ashtabula, Ohio. Reason given: a change in the long-term needs of one of its major customers.

Use of trichlorethylene to extract soybeans may suffer a jarring blow from researchers at Iowa State College.

It was found there that animals thrived on the meal (which is generally used as a livestock protein supplement) for several weeks, then often came down with a fatal hemorrhagic disease.

Ironic note: Trichlorethylene extract, which is centered in the Midwest now accounts for about 2% of total soybean meal, has been expanding—largely due to development work at Iowa State College.

A criterion of the technical manpower shortage: A Pittsburgh contracting firm is now offering about-to-graduate engineers post-Army service jobs. The firm realizes that many engineers will be called up after school, is nevertheless giving them firm offers now.

Another gimmick: Every high school in the country will get a four-color poster from Engineers Joint Council extolling the glories and opportunities of the engineering profession.

If and when a man-made plastic satellite cruises in space 1,075 miles above the earth, the power-producing combination of hydrazine and nitric acid will have put it there, says rocket expert Wernher von Braun.

Von Braun says the idea could be realized in ten years—for $4 billion. Indication of "Buck Rogers Fever": When he spoke recently at the Naval Ordnance Laboratory, 200 were expected, 4,000 came, another 3,000 were turned away.

. . . The Editors

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U.S.I. CHEMICAL NEWS

March 29 ★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1952

Resinated Ink Pigments Eliminate Ball Milling

A new process for making dry, resinated pigment chips is said to provide ink and coatings manufacturers with a means of dispersing color in their formulations without mill grinding. Zein, a chemically modified protein resin obtained from corn gluten, is used as the carrying agent for the pigment. To make the chips, pigment, zein, and zein solvent are first mixed and then charged to a 2-roll rubber compounding mill, one roll of which is maintained at 160° to 195° F., and the other at room temperature. A smoothly fused elastomeric mass results in which the pigment particles are separate and coated with zein. When sheeted from the mill and allowed to cool, the material hardens and can be ground or pulverized to fine powder. Ratio of zein to pigment can be varied moderately to obtain chips of higher or lower color value. The pigment-resin chips thus formed are said to be stable in storage, to readily dissolve in glycol and alcohol solvents, and to disperse in water. Coatings and prints from these solutions are said to be glossier and more transparent than conventional zein inks prepared by ball milling.

New Molten Metal Theory

Solidification of molten metal occurs in much the same way as the formation of snow by artificial "cloud seeding" techniques with silver iodide, according to a new theory. Metallurgical research has shown that a molten metal solidifies when its crystals are "fooled" into forming on foreign nuclei in the melt. In the same manner, snow is formed under certain conditions when water vapor is seeded with silver iodide, a compound with a crystal structure similar to that of ice crystals. The foreign nuclei in molten metals may be crystals of other metals which have an atomic arrangement similar to that of the principal metal. Cast aluminum, for example, contains tiny crystals of titanium carbide, which are similar to aluminum crystals in structure, and upon which aluminum atoms crystallize at the solidification point. Without these nuclei, solidification would not start until the material had cooled far below the melting point, it is said.

New Booklet Describes Non-Ionic Surfactants

The properties and uses of non-ionic polyhydric alcohol fatty acid esters are covered in a new booklet recently offered to the public. Data are listed for esters of glycerol, glycols, and polyethylene glycols in such applications as surface-active agents, emulsifiers, stabilizers, defoamers, penetrants, and plasticizers. Fields in which these compounds can be used include plastics, cosmetics, metals, paints, textiles and detergents. Special edible grades of the esters, available for foods and pharmaceuticals, are also described.

Commercial Propionaldehyde Now Available from U.S.I.

Highly Reactive Intermediate Expected to Find Wide Application in Synthetic Chemicals Industries

U.S.I. has announced the availability in commercial quantities of propionaldehyde, third member of the aliphatic aldehyde series, — thus providing the synthetic chemical industry with another important intermediate. Now in production at the Brownsville, Texas, hydrocarbon synthesis project, propionaldehyde is one of a number of chemicals, along with liquid hydrocarbon fuels, manufactured there from natural gas. U.S.I.'s product is carefully separated from the water soluble stream of the synthesis and subsequently purified to yield a chemical of high quality.

One of U.S.I.'s new 8,000 gallon tank cars for propionaldehyde service from the hydrocarbon synthesis project at Brownsville, Texas.

Physical properties of propionaldehyde lie between those of acetaldehyde and butyraldehyde. Its high degree of chemical activity, due principally to the aldehyde group and the presence of a readily replaceable alpha hydrogen atom, makes propionaldehyde a compound of wide potential usefulness in chemical synthesis. It condenses with itself to form an

MORE

Methionine Improves Cases Of Muscular Atrophy

The value of methionine in treating certain muscular disorders was recently reported from abroad. According to the report, a group of German doctors found that in cases of muscular dystrophies, improvement could be obtained by administering two grams of methionine by mouth daily. During methionine administration, urinary excretion of creatine and phosphates decreased. Muscular dystrophies are slowly progressive forms of muscular atrophy, or wasting away, involving special muscles and marked by delayed relaxation of muscle constrictors.

Methionine's ability to relieve such conditions is not surprising in view of its well-known role as one of the amino acids considered essential for the growth and repair of animal tissue. It is known to contribute to the synthesis of protein in living cells, and it has been used with outstanding success along with other amino acids in the treatment of peptic ulcers and starvation cases.

U.S.I. was the first large scale producer of DL-methionine. U.S.I.'s product is widely used in the pharmaceutical field and also as a supplement in animal feeds.

Absorbent Powder Measures Plasticizer Migration

A true plasticizer migration test for vinyl films, reported to give good analytical results and to be fast even at room temperature, was described at a recent conference on plastic films. The method consists of burying weighed test pieces of film in a fine, highly absorbent powder under moderate pressure to insure intimate contact. Only two powders have been found to be entirely satisfactory for the test—one a finely divided precipitated silica and the other a hydrated silica. The powder is changed at intervals, and the test sample reweighed as desired to determine weight loss. Since temperature has a pronounced effect on plasticizer migration, it must be controlled accurately. Tests are generally made at 30° C. in order to approximate temperature of summer service. Since the plasticizer is removed from the vinyl surface by physical absorption alone, no solvent or leaching action occurs as in other tests now in use. The test is said to be suitable for films with rough or grained surfaces, such as those stripped from coated cloth, as well as for smooth ones.

Find Foam Rubber, Plastic Most Suitable Filler For Hollow Plane Propellers

A novel use for elastomeric plastics was revealed in a recent account of research undertaken to provide the aviation industry with a filler for hollow steel airplane propellers. According to the report, a foamed composition of synthetic rubber and a phenolic resin was found to have the requisite lightness and strength for the job. It is explained that a 16½-foot propeller of a large airliner has cavities totaling 720 cubic inches. Less than eleven pounds of the new material is required to fill this space. The rubber-plastic foam is claimed to stay in place under the tremendous twisting and pulling forces encountered, and it is strong enough to keep the steel shells of the blades from vibrating under the changing pressures that prevail.

CONTINUED

Propionaldehyde

aldol which may be dehydrated and hydrogenated to yield 2-methyl pentanol, a hexyl alcohol of promise in the manufacture of plasticizers. With formaldehyde, propionaldehyde condenses to form pentaglycerol, a trihydroxy alcohol which is superior to glycerine and pentaerythritol for some uses. It condenses in a Cannizzaro type reaction to yield propyl propionate. An oil additive with antioxidant properties is obtained from a condensation in which propionaldehyde is one of the reactants. Polyvinyl propional resins have properties similar to polyvinyl acetal but are better adapted to some applications.

Propionaldehyde may be used to modify thermosetting resins for which other aldehydes are raw materials. It can be oxidized to propionic acid and hydrogenated to yield n-propyl alcohol. Condensation of propionaldehyde with amines produces rubber accelerators. The synthesis of many materials useful to the pharmaceutical and essential oil industries is also possible as a result of propionaldehyde's versatile reactivity.

Molten Urea Suggested As Versatile Lab Solvent

Urea may prove to be one of the most versatile laboratory solvents known, according to a recent report. At its melting point of 132° C., urea combines the solvent properties of water with those of the alcohols, and at this temperature, it decomposes only very slowly, it is said. In tests with about 120 common inorganic chemicals, sodium silicate was the only water-soluble compound which would not dissolve in urea. Iodine proved to be very soluble. Hydrocarbons were the only low molecular weight organic chemicals found that were insoluble. In the laboratory, urea proved to be a valuable tool for dissolving sparingly soluble indicators. The technique consists of dissolving the indicator in molten urea and cooling and powdering the mixture. On adding the urea-indicator mixture to a solution to be titrated, the urea dissolves immediately, leaving the indicator as a finely divided suspension in the liquid.

Plastic Ducting Systems For Chemical Plants

Ducting systems for chemical plants, made of tough, corrosion-resistant plastic, are now available, according to a recent announcement. The major construction material is a blend of styrene plastic and acrylonitrile rubber, and is said to combine dimensional stability and toughness with chemical resistance. Tanks, liners, trays, hoppers, feeders, fume exhaust hoods, troughs, and gutters are among the equipment being engineered for the handling of acids, alkalies, aliphatic hydrocarbons, and other basic chemicals. The material is claimed to offer excellent resistance to hydrochloric, hydrofluoric, phosphoric and sulfuric acids, alkalies, aliphatic hydrocarbons, and many other chemicals. The finished ducts are more durable than galvanized metal or wood, and they are easier to install because of their relatively lighter weight, it is claimed.

Offer Putty-Like Vinyls

Vinylite dispersion resins of putty-like consistency are now being offered for molding, calendering, embossing, stamping and extruding. The "plastigels" soften when stirred or kneaded at room temperature, and they can be formed with lighter weight equipment than ordinarily required for similar plastics, the manufacturer states. After they are formed, the dispersions gradually stiffen and become self-supporting. They bake to a hard, finished state in 10 to 15 minutes at 350° F. without sagging or shrinking, it is claimed. The new materials are said to be particularly suited for making floor tile, tubing, intricate electrical fittings and novelties, and they can be used for coating cloth, paper, and wire.

Lead, Copper Analyses Reviewed in New Booklet

Methods for the analysis of lead and copper with electro-analytical equipment are compiled in a 20-page manual just published. An extensive bibliography is also included.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U. S. I.

To prevent peeling of electroplated metal due to insufficient cleaning, a new method has been developed for rapidly detecting presence of grease or oil on the base metal. **(No. 779)**

Synthetic gravel, made by fusing ordinary mud with waste materials of the paper industry and other chemicals, is expected to be useful in highway foundations as well as a solution to a water pollution problem. **(No. 780)**

Resistance to "practically all" chemicals is claimed for a new rigid, non-plasticized, polyvinyl chloride plastic of high molecular weight, available in sheets, rods, fabricated parts, and molding compounds. **(No. 781)**

A new laboratory-size plastic laminating press weighs 80 pounds, and is said to be easy to install and use, and to allow controlled pressures up to 20,000 pounds. **(No. 782)**

Custom-made vinyl acetate copolymers can now be obtained in a range of molecular weights, in various solvents and concentrations, and with either increased or decreased tack, the manufacturer states. **(No. 783)**

A new tank cleaner for aluminum, magnesium and their alloys reportedly dissolves quickly in hot water to give a stable, noncorrosive, non-etching solution that rinses easily without leaving a residue. **(No. 784)**

Ability to hold solvents in a gel formation is said to be one of the properties of a new hard, odorless, wax-like compound with unusual solubility characteristics. **(No. 785)**

For permanently anchoring bolts to concrete, a new quick setting cement is available which is reported to be self-bonding, self-leveling, oil-resistant, and non-shrinking. **(No. 786)**

A blowing agent for making expanded plastics and rubber reportedly produces nitrogen on heating to 130° to 160°, is nontoxic and nonstaining, and has little effect on cure time. **(No. 787)**

To apply uniform paint films to plane surfaces for testing purposes, a direct reading film casting knife with micrometer blade adjustment is now commercially available. **(No. 788)**

PRODUCTS OF U.S.I.

ALCOHOLS
Amyl Alcohol (Isoamyl Alcohol)
Butanol (Normal-Butyl Alcohol)
Fusel Oil—Refined
Propanol (Normal-Propyl Alcohol)
Ethanol (Ethyl Alcohol)
Specially Denatured—all regular and anhydrous formulas
Completely Denatured—all regular and annyarous formuias
Pure—190 proof U.S.P., Absolute—200 Proof
Solox*—proprietary solvent—regular and anhydrous
ANTI-FREEZE
Super Pyro* Anti-Freeze
U.S.I. Permanent Anti-Freeze
ETHERS
Ethyl Ether, U.S.P.
Ethyl Ether, Absolute—A.C.S.
ACETONE — A.C.S.

ANSOLS
Ansol* M
Ansol* PR
ACETIC ESTERS
Amyl Acetate—Commercial and High Test
Butyl Acetate
Ethyl Acetate—all grades
Normal-Propyl Acetate
OXALIC ESTERS
Dibutyl Oxalate
Diethyl Oxalate
PHTHALIC ESTERS
Diamyl Phthalate
Dibutyl Phthalate
Diethyl Phthalate
OTHER ESTERS
Diatol*
Diethyl Carbonate
Ethyl Chloroformate

RESINS (Synthetic and Natural)
Arochem*—modified types
Arodure*—urea-formaldehyde resins
Arofene*—pure phenolics
Aroflat*—for special flat finishes
Aroflint†—room temperature curing phenolic
Aroplaz*—alkyds and allied materials
Aropol†—copolymer modified alkyds
Ester Gums—all types
Natural Resins—all standard grades
INSECTICIDE MATERIALS
CPR Concentrates: Liquid & Dust
Piperonyl Butoxide
Piperonyl Cyclonene
Pyrenone* Concentrates: Liquid & Dust
Pyrethrum Products: Liquid & Dust
Rotenone Products: Liquid & Dust
INSECTIFUGE MATERIALS
Indalone*
Triple-Mix Repellents

INTERMEDIATES
Acetoacetanilide
Acetoacet-ortho-chloroanilide
Acetoacet-ortho-toluidide
Acetoacet-para-chloroanilide
Ethyl Acetoacetate
Ethyl Benzoylacetate
Ethyl Sodium Oxalacetate
FEED PRODUCTS
Curbay B-G*
DL-Methionine
Riboflavin Concentrates
Special Liquid Curbay*
U.S.I. Vitamin B_{12} and Antibiotic Feed Supplements
Vacatone* 40
OTHER PRODUCTS
Collodions
Ethylene
Nitrocellulose Solutions
PiB*—Liquid Insulation
Special Chemicals and Solvents
Urethan, U.S.P.

*Reg. U.S. Pat. Off.
†Trademark Pending

U.S.I INDUSTRIAL CHEMICALS CO.
Division of National Distillers Products Corporation

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Chemical Week

BUSINESS & INDUSTRY . . . . .

Dyes: Dark Outlook

American dye producers, faced with the textile slump, find two more nagging worries confronting them.

European producers are seriously cutting in on American sales throughout the world.

Imports of foreign material are increasing; as yet, these shipments are more of a future threat than a present danger.

Textile producers again are forecasting a slump which might easily turn into a depression. For them, the prospects ahead seem bad enough. But for U.S. dyestuffs producers, with this crimp in their sales, the rebound of Germans and other Europeans into the markets which since the war belonged to Americans, bodes little good.

At present, their most serious dollarwise cut has come in export sales through government restrictions, shortage of dollars abroad, and through underbidding in prices by other producers.

Except for the cases where dye production is commercially possible only when export demands are high, exports can be considered cream.

Basic, of course, are domestic sales, and here, too, the European influence is being felt. Since the distribution pattern of no two U.S. producers is alike, there is a difference of opinion as to how much of the market now belongs to imported material.

At one end of the spectrum, a dyestuffs sales manager, while seeing dim prospects for export sales, forecasts competition in the U.S. primarily in the small-volume specialty dyes, and not in the large production items.

At the deep blue end of the scale, another sales manager reports that dyes and dye intermediates from Europe already hold a sizable chunk of the U.S. market.

Actually, both may be right, depending on several factors: first, whether dyes alone are considered, and dye intermediates excluded; second, whether the dollar volume figures include the book value of imports or whether they are set at the price which the consumer pays; and, third, what constitutes a dye, since in some cases color lakes, toners and pigments can be used competitively.

One industry source, admitting that where U.S. government statistics are not published, he is guessing, gives these comparisons based on consumer prices for dyes and dye intermediates for the past three years:

U.S. Production, in millions, including material going both to domestic and export markets: 1949, $147; 1950, $190; and 1951, $176. Prices, however, increased during the time; therefore, adjusted to 1951 levels, the three figures would be $152, $198 and $176.

U.S. Exports, again in millions, were $42 for 1949, $40 for 1950 and $28 for the past year.

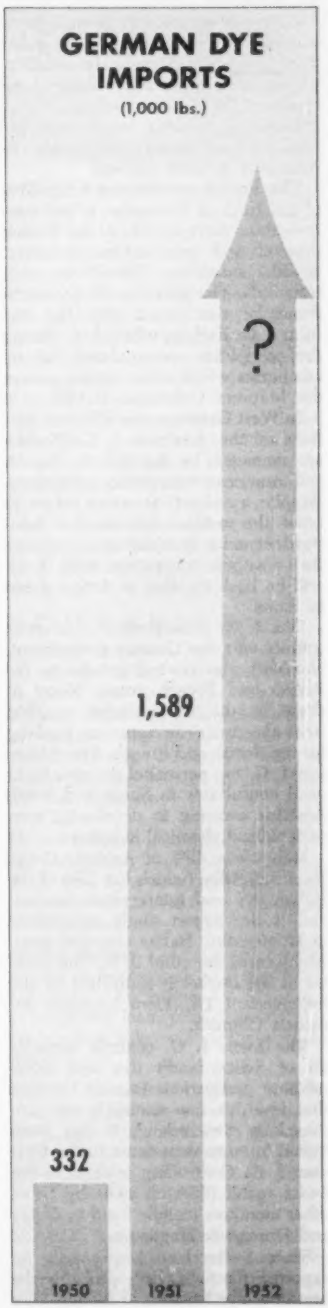
Foreign Imports to the United States (millions) went from $4.3 in 1949 to $8 in 1950 and to $14.25 in 1951. This last figure probably includes significant inventory, and so is higher than sales of foreign material.

U.S. Consumption went from $105 million in 1949 to $149 in 1950 and $160 in 1951, again including quite a considerable amount in consumers' inventory.

According to these figures, the share of the U.S. dye and intermediate market belonging to imports went from 4% in 1949 to 5.4% in 1950 and to 9.2% in 1951, with an actual percentage increase in selling value of dyes and intermediates of 78% in 1951 over 1950. Tariff Commission reports show a 436% increase in book value of dye imports alone—between 1950 and 1951—from $470,000 to $2,520,000.

There is no question that the general run of American dyes is far superior in quality to the general run of European manufactures.* In fact, world dye quality standards are set in the United States.

* During the war, when the U.S. had a shortage of khaki vat dyes, the War Production Board imported a large quantity, which as a government purchase, came in duty free. Not only did the government have difficulty selling them, but several dyers approached American dyestuffs manufacturers asking them to process the dyes up to American standards.



There is also no question that American dye production is more efficient. Offsetting this is the fact that European manufacturers pay Ph.D. chemists less than U.S. companies pay their janitors. Raw material costs, too, are lower.

Corporations there in general pay a smaller share of the over-all tax dollar than companies do here. In addition, governments often have financial interests in the dye companies.

Here's a rundown on foreign nations offering major competition to American dyestuff makers:

The French government holds 51% of the stock of Francolor, which controls about three-fourths of the French dyestuff and intermediates industry. A Ciba subsidiary, Saint-Fons, controls 20%. The government interest in Francolor was seized after the war from I. G. Farben, which had, during the occupation, consolidated the six companies which made up the prewar des Matieres Colorantes (CMC).

In West Germany, the different portions of the dominant I. G. Farben are managed by the British, French and American occupation authorities. Despite a valiant American effort to break the combine into smaller, independent units, it is almost a certainty that once the occupation ends, I. G. will be back together in action if not in name.

The I. G. management is in close contact with the German government, and with the control groups in the British and French zones. Many of those in the management expelled from the American zone are working for the British and French. Several former I. G. top personnel are now technical consultants in Spain and South America assisting in developing new nationalized chemical industries.

Italy owns 49% of Azienda Colori Nazionali Affini (which has 55% of the Italian dye and intermediate market) and is the largest single stockholder in Montecatini, Italian chemical trust, which owns the other 51%. One quarter of the market is controlled by the independent Dr. Piero Saronio's Industria Chimica.

The Swiss I. G. controls virtually all of Switzerland's dye and intermediate production. Due to the fact that few dye raw materials are produced in Switzerland, it has been linked in more than name to the German I. G. Controlling interest in the Swiss cartel (52%) is held by Ciba, other members include Sandoz, Geigy and Durand & Huguenin.

Since Switzerland is primarily an exporter, the Swiss have probably the best developed system of foreign sales agents and subsidiaries for manufacture of dyes.

In Great Britain, Imperial Chemical Industries probably accounts for 65% of production, with Clayton Aniline responsible for 20%. Clayton is a Swiss I. G. subsidiary controlled by Ciba.

It goes without saying that where governments have financial interests in dye concerns, they will look out for their interests. While this is not true in Great Britain, rigid import controls prevent other countries from coming into the domestic market.

Here in the U.S., four companies sell about three-quarters of all the dyes—Allied's National Aniline Division, Cyanamid's Calco Division, Du Pont's Organic Chemicals Department and General Aniline & Film. But despite the government's holdings in GAF, dye manufacturers feel that its policies are detrimental to American dye makers—GAF included. Say they: Not only have we helped build up European chemical producers, but by regulation have prevented use of aid funds to buy U.S. dyes.

Of course, this is only one side of the debate. On a general level, it is argued that most certainly it is to the United States' best interest to have the non-Communist countries strong industrially—and that trade can never be a one-way street.

In countering, dye makers assert that their research provided the starting point for many important chemical fields. Examples: Metallic sodium was first produced to make sodamide for synthetic indigo. The whole alkyd resin field got its start from dye makers' research on phthalic anhydride from naphthalene. (They wanted phthalic to make anthraquinone more cheaply, but now use only one twentieth of phthalic production.)

As Du Pont's Brose Chantler, president of the Synthetic Organic Chemical Manufacturers Association, puts it, "If the U.S. believes the chemical industry is a vital one, it is going to have to give us some more protection."

One form of protection is, of course, in tariffs. They feel that there are loopholes in present laws which could be closed. Also, they oppose further traiff reductions (e.g., Torquay). The government could also have done better in export regulations.

China, one of the larger dye markets, is out of bounds for U.S. producers by government fiat. Other non-Communist governments still allow trade in dyestuffs with China.

Other export markets are sizing up this way:

India. At present, the market is none too good. This has been variously attributed to the dollar shortage, bulging inventory, restriction on consumption of dyed cloth, and the fact that India can purchase through the sterling block. Cyanamid, with its interest in a dye factory there (*p. 20*), is probably better off than most.

Africa is not a large dye market, in general, and Egypt, the only important sales outlet, buys as part of the sterling block.

Mexico. With a hard currency, the dye market here is probably one of the most competitive. While at a disadvantage from freight rates, European producers are giving price concessions in order to be able to get hard money readily convertible into dollars.

Peru, Venezuela, Cuba. Similar to Mexico in having hard money, but Cuba, at least, is a small dye market.

Argentina. Closed to U.S. sellers by government regulation. Cause: dollar shortage.

Brazil. Has a favorable trade balance, and can buy with dollars. Disadvantage here is that it has been notoriously slow in paying for materials.

The situation is dark in general for U.S. dye exports, if you base your comparison with the postwar years. Compared to prewar, however, the U.S. is ahead. But capacity of American producers has greatly increased since 1939—up 30% through 1950. By the end of 1952, they should be able to make $210-$215 million worth of dyes yearly. The big question right now is where all this will go.

EXPANSION . . .

Coal Tar: Koppers has been awarded the design and construction contract for a new battery of chemical-recovery coke ovens for Jones & Laughlin's Hazelwood plant in Pittsburgh. The project is expected to consume a large part of J&L's $23 million certificate of necessity granted last month.

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Chlorine: Diamond Alkali has awarded H. K. Ferguson the contract for expansion of its Painesville, Ohio, electrolytic chlorine-caustic facilities (*CW, Newsletter, Aug. 25, '51*). The expansion program will enable the company to abandon production of caustic via the lime-soda process.

•

Alumina: Alcoa is planning a $12 million expansion of alumina production in the Mobile, Ala., facilities of its Aluminum Ore Co. subsidiary. The expansion will increase capacity by one-third—to the point where, by 1953, the plant will produce the alumina needed to make 1,200 tons of aluminum metal per day.

TECHNICAL AUDIT: Consultations and checking lead to new products and profits.

See Yourself As Customers See You

Quadrupled sales in the last two years is the major result of Michigan Pipe Co.'s decision to use a relatively new tool of management, the Technical Audit.*

After 80 years in business, the manufacturer of special piping for the chemical and paper industries decided it was time to do a little lifting by bootstraps, called in the Commonwealth Engineering Co. of Ohio to perform its Technical Audit. That was in 1949. Today the pipe company is better off, gives a lot of credit to the audit.

Commonwealth's audit is essentially a broad job of industrial engineering on a consultant basis. It investigates both internal operations from the engineering viewpoint, and external operations—viz., customer relations and the competitive situation. The investigation deals with advertising, sales, production, research, and engineering; patent and trade-mark situations; status of competitors' products on the market, and the attitude of customers to the company's products and the products of its competitors.

With the facts in hand, Commonwealth then makes suggestions for improvement and recommendations of specific things to be done together with an estimate. It will not tell anyone how to run his business, but will find facts, draw conclusions, present the picture—good or bad.

Bought, Not Sold: The audit of Michigan Pipe showed how the company had been "coasting" for many years; products had been "bought" rather than "sold." For 25 years the company had done little to stimulate sales representatives; to arouse direct sales interest; to improve, change or modify its product line in any way; or even revise its catalogs.

Further digging showed that both agents' commissions and raw material purchasing prices were way out of line with modern marketing conditions. Customers were found to be generally satisfied with Michigan Pipe's products, but certain suggestions were made for minor improvements in design. The industrial necessity for the wood and wood-lined piping that was the company's major product was reaffirmed.

Face Lifting: Working closely with Michigan Pipe's officials, Commonwealth helped set up arrangements for new sales offices, rewrote most of the company's sales and engineering literature, and recommended changes in production and engineering methods to reduce costs and improve the product.

Most important innovation adopted at the engineering company's recommendation was the introduction of an entirely new product, but one which could be fabricated on the same equipment used for the wood-lined pipe. This was Michigan Pipe's new Saran rubber-lined steel pipe. Already this new product accounts for over 15% of Michigan Pipe's total volume in pipe sales.

Big Too: The consulting industrial engineer's place is not confined to the smaller company, although it is there that he is particularly useful. It has its role with the big boys too.

Recently Commonwealth did an audit for one of the largest chemical firms, when that company was thinking of going into the manufacture of powder metallurgy additives. The audit said "no" and the company accepted Commonwealth's negative recommendation.

Outsider: The place of the industrial engineer in present day industry, while already large, is still growing and only imperfectly understood by many in the chemical industry—particularly in the smaller companies.

Whether it is Commonwealth, or one of the many other industrial engineers or firms, they cannot perform miracles. They analyze and report, but what is done with the report is none of their concern—except of course insofar as they are in position to carry out their own recommendations, as many are.

But if a company wants to know what ails it, as Michigan Pipe did, where its weaknesses and strengths are, what kind of job its personnel is doing all the way from top management to production worker, and what its customers think of it, a thorough job of industrial engineering can shed light.

COMPANIES . . .

Publicker Industries' ownership will be extended when 300,000 shares of its stock, now owned by the estate of Harry Publicker, go on sale through an underwriting group headed by Merrill Lynch, Pierce, Fenner & Beane. The proceeds go to the estate, not the company.

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Dewey & Almy, having just got a five-year, $2 million loan from W. R. Grace (*CW, Feb. 2*), is now negotiating with insurance companies for a loan of up to $5 million.

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Dayton Rubber has increased to $7.5 million its borrowings from Equitable Life with a $2 million 4% note, due in 1965, the loan, plus proceeds of a recent stock sale, will go for working capital.

•

Emery Industries' original candle-making operations—which began in 1840—have been sold to a group of investors. The new company, known as Candle Lite, will still use the Emery brand name for its candle sales.

•

Stauffer Chemical has begun taking up options for 180 acres in Louisville, Ky., near the Ohio River. Hydrogen chloride, one of the plant's products,

* Trademark of Commonwealth Engineering Co. of Ohio.

Current List of DPA-Certified Chemical Facilities

Company and Location	Product	Amount Applied for	Amount Certified	% Certified
Koppers Co., Inc., Follansbee, W. Va.	Crude naphthalene	267,000	267,000	60
Allied Chemical & Dye Corp., Detroit, Mich.	Naphthalene	1,012,000	1,012,000	60
Koppers Co., Inc., Fontana, Calif.	Naphthalene	2,425,800	2,425,800	60
Phillips Petroleum Co., Phillips, Tex.	Cyclohexane	160,310	136,210 8,250	90 40
Kaiser Aluminum and Chemical Corp., Tacoma, Wash.	Aluminum	2,850,000	2,850,000	60
Pennsylvania Salt Mfg. Co., Wyandotte, Mich.	Super tropical bleach for military use	282,762	282,762	70
Arnold Hoffman, Dighton, Mass.	Military chemicals	435,530	315,314	50
Hooker Electrochemical, Niagara Falls, N. Y.	Trichloro-benzene	475,000	470,500	45
Gamma Chemical, Great Meadows, N. J.	Hydroxy-quinoline	76,899	74,884	60
Du Pont, Deepwater Point, N. J.	Ponsol dyes	1,908,000	1,786,000	50
General Aniline & Film, Grasselli, N. J.	Chloromycetin intermediate	257,000	211,968	60
American Smelting & Refining, Barber, N. J.	Selenium	755,540	755,540	70
Heyden Chemical, Garfield, N. J.	Resorcinol	397,710	397,710	65
Fairmount Chemical, Newark, N. J.	Hydrazine	169,850	146,350	90
E. R. Squibb, New Brunswick, N. J.	Penicillin, streptomycin	1,697,119 5,484,000	1,697,119 2,265,000 3,219,000	55 45 60
American Cyanamid, Bound Brook, N. J.	Military textile dye	1,305,000	955,000	50
Revlon Products, Flemington, N. J.	Aerosol insecticides	44,490	44,490	45
Ciba States, Ltd., Toms River, N. J.	Military chemicals	12,185,000	2,746,500	50
Allied Chemical & Dye, Marcus Hook, Pa.	Lindane	351,000	351,000	45
Koppers Company, Oil City, Pa.	Aviation fuel antioxidant	195,792	195,792	50
Koppers Company, Kobuta, Pa.	Benzene and homologues	181,027	181,027	90
Monsanto, Anniston, Ala.	Military chemicals	314,000	229,000	80
Monsanto, Anniston, Ala.	Biphenyl, aroclor	571,000	571,000	60
Dow Chemical, Midland, Mich.	Salicylic acid	1,034,000	1,034,000	55
Reilly Tar & Chemical, Cleveland, Ohio	Naphthalene	903,415	903,415	60
Dow Chemical, Midland, Mich.	Styrene	182,280	182,280	60
Monsanto, Monsanto, Ill.	Antibiotics	358,560	358,560	60
Reilly Tar & Chemical, Granite City, Ill.	Crude naphthalene	110,880	110,880	60
Monsanto, St. Louis, Mo.	Hydraulic fluids	315,000	315,000	45
Monsanto, St. Louis, Mo.	Phthalyl chloride	310,000	310,000	45
Diamond Alkali, Houston, Tex.	Hydrogen	194,490	194,490	65
Dow Chemical, Freeport, Tex.	Benzene	1,100,000	1,100,000	90
Du Pont, Orange, Tex.	Polyethylene	6,195,000	6,195,000	60
Salt Lake Refining, Salt Lake City, Utah	Cumene for phenol	1,760,000	1,358,000 402,000	50 40
Standard Oil of Cal., San Francisco, Cal.	Phenol	5,340,000	4,605,000 723,000 12,000	50 45 15
Hooker-Detrex, Tacoma, Wash.	Trichlorethylene	337,000	337,000	50
Cooperative Farm Chemicals Assn., Lawrence, Kans.	Nitrogen 51,800 tons	13,818,000	[1]	45
Allied Chemical & Dye, Midwest[2]	Nitrogen 61,700 tons	24,600,000	[1]	45
Deere & Co., Missouri[2]	Nitrogen 57,600 tons	18,500,000	[1]	45
Mathieson Chemical, Lake Charles, La.	Nitrogen 5,500 tons	411,000	411,000	45
San Jacinto Chemical, Houston, Tex.	Nitrogen 11,500 tons	900,000	900,000	45
Sid Richardson, Pointe-ale-Hache, La.	Nitrogen 86,400 tons	19,000,000	[1]	45
Pacific Chemical, Pasco, Wash.	Nitrogen 18,100 tons	5,735,000	[1]	45
W. R. Grace, Illinois[2]	Nitrogen 72,000 tons	15,466,000	[1]	45
National Chemical, Yazoo City, Miss.	Nitrogen 34,500 tons	7,212,446	[1]	45
Delta Chemical, Buras, La.	Nitrogen 25,900 tons	8,892,000	[1]	45

[1] DPA will determine amount later.
[2] Applicant has not specified exact location.

will be piped to Du Pont's neoprene plant.

•

St. Lawrence Corp., Montreal, which has been a holding corporation controlling three Canadian pulp producers, will become an operating company by absorbing the assets of the three—St. Lawrence Paper Mills, Lake St. John Power & Paper, and Brompton Pulp and Paper.

•

Dow Chemical's Brazos Oil & Gas subsidiary has signed an agreement with Union Oil covering exploration, drilling and oil and gas production on jointly-owned land in California's Sacramento Valley.

Incidentally, Dow's board of directors has approved purchase of 195 acres fronting on the St. Clair River (Ontario). The land has been part of the Sarnia Indian Reserve.

•

Cleveland Graphite Bronze, which recently purchased crystal-making Brush Development Co., has borrowed $5 million from Metropolitan Life Insurance at 3¼%, due 1971. This, as well as an earlier $10 million borrowing from Metropolitan, will go to furnish working capital.

•

Pittsburgh Plate Glass is readying its first public financing request. The company has registered its plan to sell $40 million in sinking fund debentures with the SEC. During the past five years, the company has spent better than $137 million.

•

Dominion Tar & Chemical: Need for expansion capital has brought a public offering of $10 million in 5% sinking fund debentures due over 15 years.

The company plans a $15.3 million expansion program. Incidentally, Dominion has begun construction of a $1 million addition to its phthalic anhydride works at Toronto.

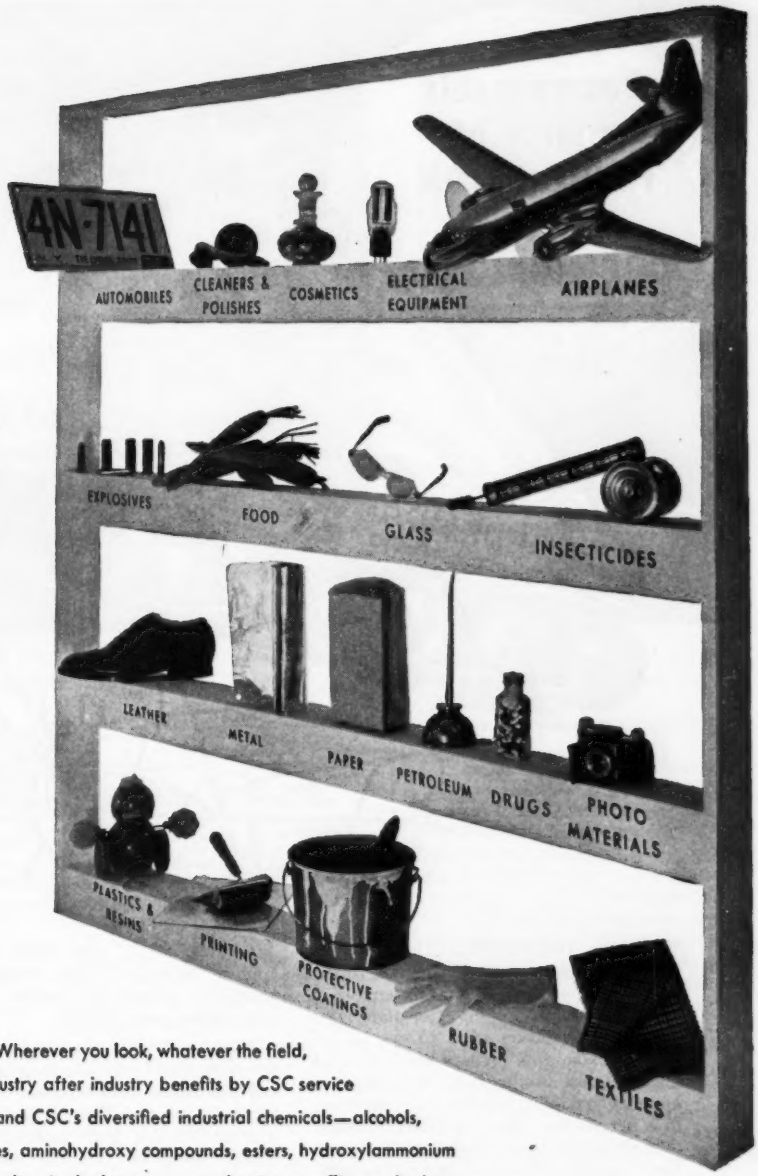
•

Hooker Electrochemical has sold $2.4 million worth of notes to private investors. It previously borrowed $3.6 million from the same sources for general corporate purposes.

Bluebonnet Lull

Despite the chemical boom in Texas (*CW, Mar. 22*), at least one plant there is not busting out at the seams. It's the Bluebonnet starch and sugar plant of Corn Products Refining Co. at Corpus Christi which can't expand because of the high prices and scarcity of its raw material, grain sorghum. That was the word William T. Brady, company vice president in charge of manufacturing, gave to company of-

20 different ways to look at CSC



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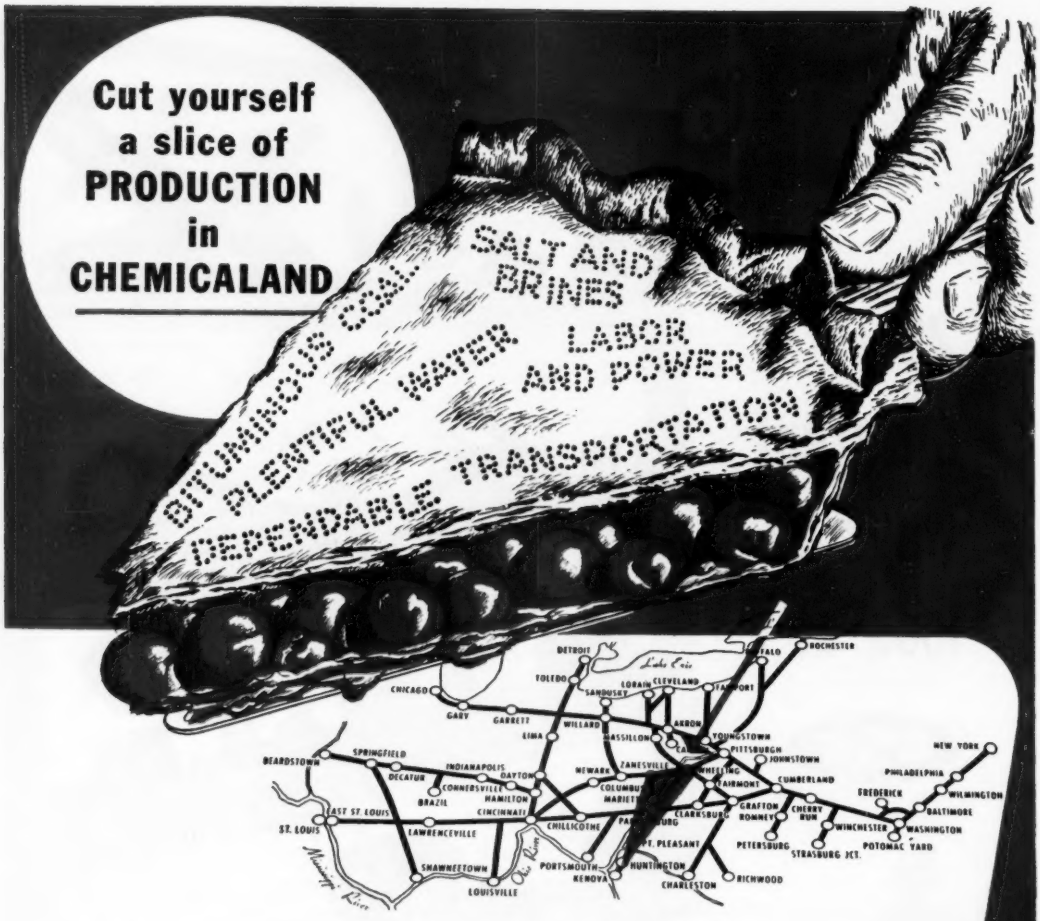

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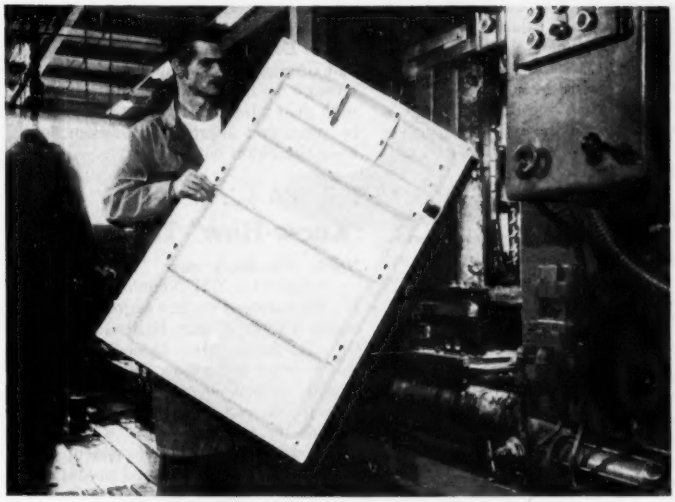

Giant Polystyrene Molding

ONE-PIECE refrigerator door liner, world's largest thermoplastic molding coming off press at Amos Molded Plastics (Edinburg, Ind.), presages a large new market for molding powders in such giant pieces. This one is made of polystyrene, weighs seven and a half pounds, has a surface of 1,240 sq. in. It's going into the newest Admiral refrigerators.

ficials at a meeting earlier this month.

The plant was located at Corpus Christi to be near raw materials, but a drought in the area has limited supplies, and forced the plant to more or less coast for the present. Cost of shipping from other areas, added to the already high prices of grain, makes production costs very high.

Brady is reported as saying that these untoward conditions, combined with present retail prices of sugar and starch, mean that Bluebonnet is operating on a non-profit basis.

Moreover, the postwar foreign market for starch has failed to develop as anticipated, so the plant is not making that product at capacity. Actually instead of a demand for starch for export, grain is being bought abroad and processed in "soft dollar" countries, Brady pointed out.

Production of sugar, however, is at capacity. Bluebonnet's dextrose has met with such fine acceptance by the trade, according to Brady, that the company is reaching out of the economic market range to supply demand.

But the company is still optimistic about the future of grain sorghum, Brady emphasized.

"We are not in business on a short-term policy," he said. "Business in general is only fair at present, but that in no way changes our opinions or projections on a long-term basis."

LABOR . . . . . .

Tooth For A Tooth

In British Columbia these days employers are buying their employees new sets of choppers, and furnishing special mouthwash to cut down this latest overhead bite.

At least that is the sad fate of Consolidated Mining & Smelting Co. at Trail, where 93 workers are sporting new company-bought teeth, and the washrooms are now completely equipped with the company's mouthwash.

Facts: The trouble comes from the effects of fumes on the teeth of men working in the zinc room of the Trail smelter. Examination of the teeth of the 248 workers in the zinc room turned up the lucky 93 who showed abnormal wear in their store teeth. Apparently the culprit is an acid mist which the company is now trying to find some way of eliminating or counteracting.

Meanwhile the teeth are being given out and the alkaline mouthwash is at hand for protection against the "porcelain plague."

•

Strikebound-Shut Down: The Oil City, Pa., plant of Koppers Co., strikebound since Jan. 31, has been shut down completely pending a settlement between the company and the striking

Newspaper classified columns are full of ads for engineers, chemists, technicians. Employment agencies are besieged with requests for trained technical men.

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Gas, Coke & Chemical (CIO) local.

Until recently salaried employees had kept the boilers going to prevent a freeze-up in the plant. Now all chemicals have been drained from tanks and pipes until a settlement is reached. It will take 30 days to get the plant back in operation once the opponents make peace.

•

Union Shift: Gas conversion men, working to convert home and industrial equipment to the use of natural gas in the Brooklyn, N.Y., area, are in the middle of a conversion battle of their own. Result: Two thousand of them, members of Local 274, Pipefitters (AFL), have voted to disaffiliate and join the Gas, Coke & Chemical Workers (CIO).

According to UGCCWA officials the disaffiliation vote climaxed a recent mass meeting called by the dissident men to effect the change. Election petitions have already been filed by the Chemical Workers with NLRB.

•

Organizing Drive: CIO's Gas, Coke & Chemical Workers have pushed their organizing drive into the New York office of General Dyestuffs Corp. The union has organized the laboratory, office and warehouse employees of the company. The warehouse men were formerly represented by an AFL union, and something of a donnybrook appears to be on between the AFL union and Gas, Coke.

•

AFL Organizing: Several hundred workers at Charlestown, Ind., Hoosier Ordnance Works, operated by Goodyear Engineering Corp., have joined the International Chemical Workers (AFL) and the union has begun a drive to organize the rest of the 2,400 eligible employees. The corporation has been asked to recognize the union, but as yet has taken no stand on the matter. The AFL Chemical union is ready to call in the NLRB if necessary.

•

Jurisdictional Dispute: Construction work has been halted on Gulf Oil's new ethylene plant at Port Arthur, Texas, as a result of an Iron Workers' picket line. The union is picketing the Lummus Co. as a result of a jurisdictional dispute. Some 260 construction workers honored the picket lines.

•

Company Loses: NLRB has ordered the Connecticut Chemical Research Corp. to reinstate with back pay 23 employees it failed to rehire three years ago after a one-week shutdown when District 50-UMW was seeking recognition. Fifteen others who were rehired must be reimbursed for wages lost during the shutdown.

The Board found that the company had discriminated against workers interested in the union, and interfered with their efforts to organize the plant by promising improved conditions to keep the union out.

LEGAL . . . . . .

"Know-How" Tax

North Carolina's new "nickels for know-how" tax (*CW Newsletter, Nov. 17, '51*) survived its first major test recently without a fight. Ralston Purina Co., St. Louis, Mo., agreed to pay the tax after indications had led state officials to believe that the company intended to make a test case to determine the law's validity.

The tax consists of an assessment of a nickel per ton on all feed products sold in the state; the proceeds go into agricultural research. The tax, which was overwhelmingly approved by the people in a special referendum last November, also applies to all commercial fertilizer sold in the state.

When the state received a check which failed to cover the new tax, but instead paid only the established inspection fee, it was assumed that the company was going to resort to legal action. But soon after a wire was sent indicating the state's intention of putting a stop-sale order on all Ralston's feed stocks in the state, the company came across.

Revenue from the new tax is handed over to the Agricultural Foundation at North Carolina State College for the promotion of agricultural research and the dissemination of research information.

•

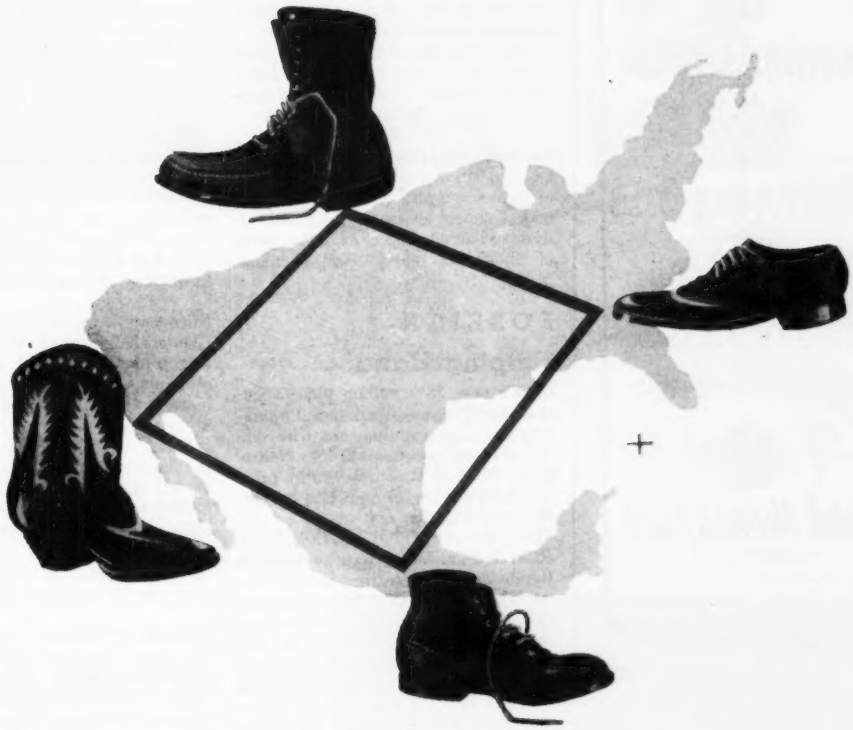
Titanium Price Problems: Two Massachusetts chemical firms have been named by the Office of Price Stabilization in injunctive and treble damage actions filed in U.S. District Court, Boston.

The Government charges American Monomer Corp. with buying 98,700 pounds of titanium dioxide from Milprint, Inc., Wisconsin, and reselling it at various prices up to 80¢ per pound when the ceiling price was 24¢. Overcharges came to $26,059, which adds up to treble damages of $78,177.

Franklin Paint Co. is accused of selling 21,550 pounds of titanium dioxide at over-ceiling prices, with overcharges to the tune of $8,688.75. Damages asked in this case are $26,000.

•

Helping Hand: The Texas Independent Producers & Royalty Owners As-



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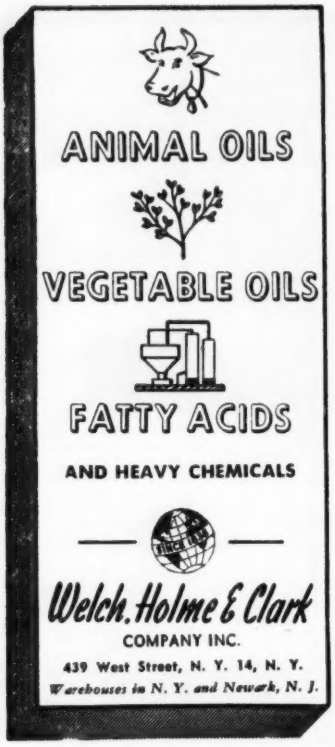

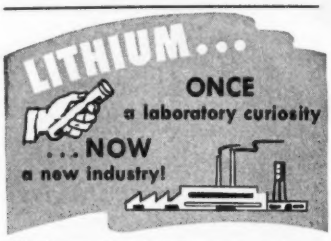

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sociation is giving a helping hand to the state in the latter's court defense of its new natural gas pipeline test.

More than 40 companies have filed suit against the state challenging the constitutionality of the tax. First case went on trial March 17 in Austin.

•

Ordinance Attacked: Shell Chemical Co. has attacked the validity of an ordinance adopted by the Deer Park City Council annexing more than a thousand acres of land, including parts of Shell's oil refinery and chemical plant.

FOREIGN . . . . . .

Helping Hand

India's new $3½ million pharmaceutical and dyestuff plant started operation last week simultaneous with official send-off by Prime Minister Nehru. From 20 to 25 dyestuffs will be manufactured for use in mills and bazaars throughout India.

The plant—Atul Products Ltd.—located at Bulsar, India, midway between Bombay and the textile town of Ahmedabad, is the first Indian venture in manufacturing pharmaceuticals and dyestuffs. In the past, India has had to import all her necessary dyes—primarily from Germany, Japan, Britain, Switzerland and the United States. The plant is an important step in the age-old Indian dream to establish basic industries of her own, and thereby gradually cut her need for depending on the outside world for finished goods.

The Atul plant is a joint project. India's Kasturbhai Lalbhai, owner of the biggest group of cotton mills in Western India, pioneered the idea, invited the American interest and participation of American Cyanamid Co. in 1949. As a result of the unique agreement, the American partner is investing 10 per cent of the initial capital and is lending technical assistance and guidance.

Three types of dyes are scheduled for production—azo, sulfur and alizarine—with the sulfur black due to make the first appearance. Azo dyes, however, will constitute the greater part of the output. Alizarine will get its start at a later date—under more auspicious market conditions.

The dyestuffs are aimed naturally at the well-developed native textile industry and are intended not only for the dyeing of cotton, but also for wool, paper and synthetic fibers.

Production equipment includes vats of Indian teakwood, cut from local jungles and crafted by Indian shipbuilders. Atul chemists are keeping an appraising eye on teakwood and its chemical reaction to the various acids and alkalies involved in the processing. The use of teakwood in the manufacture of the dyes has cut costs by about half—cypress is often employed for this purpose in the United States.

Future Prospects: Both Indian and Cyanamid experts are planning greater size in future years. They point to the production of crudes as a natural development, cite benzol which is already being made by an Indian concern. And Atul has 850 acres in which to exercise expansion freedom.

•

Nitrogen: African Explosives and Chemical Industries' $12 million nitrogen plant is keeping pace with its schedule, which calls for a 100% increase in nitrogen production within two years.

From its Modderfontein factory, the largest explosives factory in the world, the new plant will produce 33,000 tons of ammonia per year, as against the current 26,000 tons. The nitrogen project will obviate South Africa's dependence on foreign supplies for its explosive industries.

•

Chlorinated Rubber: Last November the VEB (peoples-owned) Electrochemisches Werk Ammendorf, formerly Chemische Fabric Buckau, Ammerndorf/Halle (Saxony) resumed the production of chlorinated rubber in the East Zone of Germany. For 1952, the firm hopes to produce 120 tons, most of which will go into the manufacture of special lacquers.

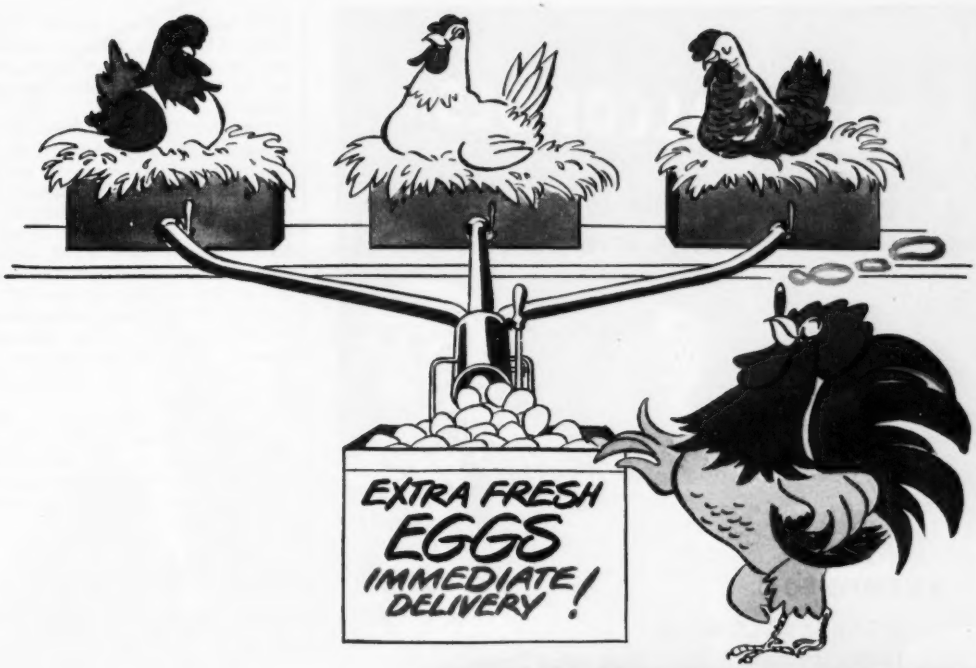
•

Phosphate: One of the larger Moroccan phosphate producers—Societe Cherifienne d'Engrais et de Produits Chemiques—upped its production of superphosphates from the previous year's 68,000 tons to 84,720 tons for 1951—a 25% gain. Production of sulfuric acid from sulfur totalled 16,362 tons; sulfuric acid from pyrites, 16,336 tons.

Not Too Bad

Consensus in Washington chemical circle this week was that the onetime rush to get chemical expansion certified for rapid tax amortization was pretty much over, except for such special programs as sulfur. "Things," said NPA's Henry Fowler, "are not too bad."

In an up-to-the-minute tabulation, Defense Production Administration has found that of 7,188 rapid write-offs granted, 7%, or 507, went to the chemical industry. But certificate size was above average: The chemical industry proposed to spend more than



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$1.68 billion out of a total of $14.58 billion—11%. This total is exceeded only by facilities for iron and steel, and by railroads and other transportation.

But while DPA or its NPA do not feel in a rush about chemical expansion, new applications are still coming in. NPA received 53 requests for chemical write-offs during February.

As of last week, NPA's chemical division has received 1,200 applications, has processed and forwarded 900 of them to DPA. Of the 300 remaining, 50 have been processed and will be submitted to DPA when programs in the particular field are set up or expanded. The remaining 250 are "in process."

Of the 900 forwarded to DPA about 600 have been acted on. This, of course, includes the 507 already announced. The 300 remaining applications remain to be passed or turned down by DPA.

KEY CHANGES . .

Graham Erdwurm: To president, George A. Breon & Co., subsidiary of Sterling Drug, Inc.

Gordon H. Chambers: From executive vice president to president, Foote Mineral Co.

H. J. Hagn: To president, Chiksan Co.

Mangum Webb: From sales manager to vice president, Chemical Construction Corp.

Barry T. Leithead: To director, The B. F. Goodrich Co. He is president of Cluett, Peabody & Co., Inc.

Hamilton F. Croft: From vice president, international div., to president, S. C. Johnson & Son, Ltd., Brantford, Ontario.

Albert F. Smith: To director, Carothers Research Lab., textile fibers dept., E. I. du Pont de Nemours & Co.

Charles L. Smith: To associate director of product development, agricultural chemicals, Ethyl Corp.

Sewall D. Andrews: To general manager, chemical div., General Mills, Inc.

Gilman S. Hooper: To manager, high polymer research, Industrial Rayon Corp.

Winthrop R. Corey: To sales manager, phosphate div., Monsanto Chemical Co.

Charles S. Curtis: From sales manager, Wilson Labs., to manager, pharmaceutical sales div., William E. Phillips Inc.

Model depicted here is the original paper bag "tubing" machine on which James Arkell obtained patents. This, and Arkell's original "bottomer" are the two basic machines after which all modern paper bag making machines have been patterned.

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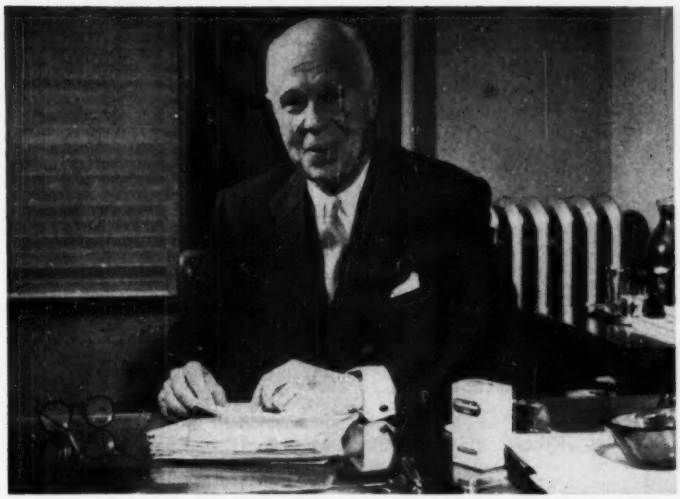

RYSTAN'S O'NEILL RYAN: Legal tangle, market muddle.

Patents on the Green

Rystan chlorophyll patent for ointments, pastes, solutions and creams, ruled valid, shakes finger at present or potential manufacturers of products of this type.

Maker of internal deodorant tablets has patent pending for "specially prepared" chlorophyllins.

Chlorophyll producers, with consumer products still booming, eye industrial sphere.

Early this month, a water-soluble type chlorophyll patent (U.S. 2,120,667) retained its status as an honest woman in the green "miracle" sphere (*CW, June 16, '51*). In Dallas, Tex., Federal Judge William H. Atwell upheld the claims of the Rystan Co., Inc. (Mt. Vernon, N. Y.) covering the therapeutical use of its chlorophyll compositions.

The decision climaxes an infringement suit Rystan instituted last October against Warren-Teed Products of Columbus, O. In answering Rystan's charge, the Columbus company promptly challenged the validity of the patent. But Rystan president O'Neill Ryan, Jr., produced evidence to convince the court of chlorophyll's efficacy, was awarded an injunction and damages of $6,727.

Still a Question: How will this patent affect other companies manufacturing or planning to manufacture chlorophyll therapeutical or deodorant products? In that the patent covers any "formulation containing water-soluble derivatives of chlorophyll in aqueous solution," it will touch the manufacturer of any chlorophyll ointment, solution or cream in which water is present. However, dry compositions—pills, tablets, chewing gum—are outside the patent's scope, even though the products may contain water-soluble derivatives of chlorophyll.

Chlorophyll deodorant tablets are also in for patent play. Walker Laboratories, Inc. (also Mt. Vernon, N.Y.) has applied for a patent to protect both preparation and application of its "specially prepared" chlorophyllin tablets and capsules.

The Rystan and Walker patents will not conflict with one another. Rystan's products are primarily ethical, are for the most part used in topical treatment of infections; Walker products stress deodorant qualities, are for internal application. Both firms, however, claim deodorant and healing properties for their preparations.

Still in patent no-man's land is an over-the-counter product such as Colgate-Palmolive-Peet's new Colgate Chlorophyll Toothpaste, now being test-marketed in four cities. Colgate, boasting its own "exclusive formula," might possibly evoke infringement legal action by Rystan. Makers of internal deodorant tablets may be placed in a similar defensive position if and when Walker's patent comes through.

After licensing Lever's Chlorodent, Rystan has steadily refused to license additional chlorophyll dentifrices. Moreover the company has its own Chloresium toothpaste—both as an ethical and commercial product. (Rystan's own products are all sold under the trade name Chloresium.) At present, Rystan also licenses Pharmacraft for its mouthwash, Oteen, and the Americaine Co. for ethical ointments.

In commenting on the decision, Mr. Ryan indicated that he had been waiting for this opportunity to establish his patent's validity and was now ready to "take under advisement other applications for licenses."

Walker's "specially prepared" chlorophyllins were developed by F. Howard Westcott and J. A. Killian, who acidified raw chlorophyll solutions in breaking down the material. The resulting chlorophyllins are claimed to make chlorophyll available in a form which people can digest more readily. Dr. Westcott bumped into the deodorizing nature of chlorophyll while investigating its potentiality in the treatment of pernicious anemia.

Although the patent is still pending, Walker has already acquired licensees: Depree Co. (Holland, Mich.), Pitman-Moore Co. Inc. (Indianapolis, Ind.), Chas. E. Frosst & Co. (Montreal, Can.) and Timerson Canning Co. (Fauport, N. Y.).

Still Hazy: What is the "miracle" of chlorophyll? Evidence* points to chlorophyll as a non-toxic, effective deodorant. Still in question is its value as a tissue stimulant, bacteriostatic agent and as a medicant. Just how chlorophyll heals or deodorizes is not as yet known either.

But a bit more quietly than admen, research and medical workers are trying to find answers, are tracking down chlorophyll's action in wound healing, cell growth stimulation, burn therapy, treatment of dermatoses, rhinitis control and the alleviation of other conditions. Walker Laboratories, acting on the results of these studies, is about to bring out a product—Hemicin for the treatment of anemias—which goes right back to the original work done by Westcott in blood regeneration.

Still Climbing: Chlorophyll producers and formulators, however eager to

* Tests made by F. H. Westcott (body and breath deodorization), Royal M. Montgomery and Henry B. Nachtigall (body deodorization), Henry N. Moss (treatment of foul-smelling wounds) and Maurice Serling (dogfood for deodorizing dogs).

learn the "why," are not waiting for it; they are cashing in on chlorophyll's amazing acceptance by consumers. Production of basic chlorophyll has increased eight-fold since 1949. New producers such as Keystone Chemurgic Corp. (Bethlehem, Pa.) and National Alfalfa & Milling Co. (Lamar, Colo.) have leaped eagerly into the field with American Chlorophyll, Inc. (Lake Worth, Fla.)—at one time sole producer and still the largest. Newest entrant is Chlorophyll, Inc. (Neodeosha, Kans.) which went into operation only last month.

Individual types of chlorophyll products multiply in the time it takes to count up those existing. Following the original invasion of the deodorant business by the odor-control tablets (Odolex, Klore, Nullo, Ennds, Chloresium, Squairs, etc.) have come the chewing gums (Chlorets, Chlorosin, Clor-Amo), toothpastes (Chlorodent, Chloresium, Colgate Chlorophyll Toothpaste), facial cream (Chlore-Creme), shampoo (Clo, now being test-marketed in Miami by Bymart Tintair, Inc.) and indigestion pills (BiSoDol Chlorophyll Mints, introduced by The Whitehall Pharmacal Div. of American Home Products).

Chlorophyll dogfood appears on grocery shelves in canned, biscuit and meal form (Ditman-Moore, Quaker Oats and National Biscuit). The Sterling Tobacco Corp. claims its new chlorophyll cigarette reduces irritation and soothes sore throats. Even aquariums have taken up the idea, adding chlorophyll derivatives to the water for purification and deodorization.

Future Outlets: Chlorophyll producers have still another sphere to invade—the unexploited industrial market. They are playing with the idea of promoting chlorophyll derivatives as industrial deodorants for chemicals in process as well as for end products. One company—A. Allan & Son of Harrison, N. J.—is utilizing a chlorophyll-containing compound for the control of sulfide odors emanating from foam rubber underrugs.

Underground Aid

Hard on the heels of the USDA's registration of aldrin (*CW, Newsletter, Mar. 23*) as a soil insecticide has come further news: Addition of pesticides to soil helps the growth of young apple and peach trees.

The USDA unearthed this latest information during studies in West Virginia to determine if continued use of insecticides would cumulatively poison orchard soil. The ground around trees was loaded with chemicals, and to the surprise of researchers who had expected growth stunting, growth rate was actually boosted.

Test plots were given an extra heavy dose of agricultural chemicals like lead arsenate, parathion, DDT, benzene hexachloride (BHC), chlordane, toxaphene, zinc-lime, sulfur, fermate, and 2,4-D. The arsenate-treated soil withered trees. But soils with the other insecticides had the reverse effect—BHC gave particularly enhanced growth.

The soil around the trees was stripped bare of the cover growth, but the trees weren't damaged. (Removal of cover plant life recalls recent news of now-testing application of chlordane to turf as a herbicide; trials in the Midwest show encouraging destruction of crabgrass in lawns.)

This removal of the weeds and grass surrounding the trees has been offered as one possible explanation of the increased growth rate. USDA theorizes that the trees benefit by not having to compete with the other plants for soil nutrients.

Another explanation for the increase is the killing of underground insects which sap tree vigor.

The insecticides are applied by spraying the soil surrounding the trees. Test originally were to duplicate the application the soil might receive during 10-30 sprayings of the foliage; since the initial success with this treatment, direct application to the soil has been tried.

USDA is still testing the idea, and has made no specific recommendations yet. It's warning orchardists against hazardous gun-jumping, because test results have been varied.

The registration of aldrin (produced by Julius Hyman, sold to formulators by Shell Chemical Co.) for soil use is strictly for control of soil pests such as wireworms, white grubs, sugar beet maggots, and root worms.

•

Bleach Suit: A suit filed by the operating partners of the Barton Chemical Co. (Riverside Ill.) charges the Purex Corp. Ltd. with trying to eliminate competition by selling below cost. Barton, maker of Savaday bleach, claims Purex dried up the market for its product in the Southwest and South by allowing rebates, discounts, and free Purex with purchases. Once Barton was out, it is claimed, Purex boosted prices to former levels.

•

Fire-Retardant Paint: Refrac, fire retardant paint said to withstand temperatures exceeding 1000C, is marketed in England by W. E. Coss & Co., Ltd., American Export Consultants, London.

Devised to protect runways from aircraft jet blasts, it can also be used

Fused Porcelain Enamels Go Arty

PORCELAIN ENAMELS, familiar as the hard finishes on stoves and refrigerators, are now being used artistically, too. Edward Winter, Cleveland, has revived the ancient art of enameling, produces colorful, long-lasting murals. He utilizes pigmented compounds, which are fused to the metal much as kitchenware makers fuse on durable white finishes of titania enamels. Mural shown depicts flow of water from Lake Erie to consumer, is for Cleveland's new water plant.

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Typical of its inorganic manufactures are the chemicals required for the production of fluorescent lamp and television tube phosphors, such as silicic acid, calcium phosphate, calcium carbonate, and magnesium oxide. Mallinckrodt's "Standard Luminescent" grade of these and other products has won wide acceptance in the electronic industry.

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as heat insulation. In other than inside use, it must be weather-proofed. Price, for white and colors: $6.50 gallon, one or five gallon containers.

•

Non-Clog Salt: Diamond Crystal-Colonial Salt division of General Foods is introducing its new Weather-Pruf (free-running) salt. The formulation uses about 2% calcium silicate to provide the non-clogging properties, commands no premium price.

•

Waterstopper: Dapco Products (Knoxville, Tenn.) is making a low-cost mineral coating for halting water seepage through masonry. Available in white, colors, and clear.

•

'Copter Sprayers: DDT emulsions sprayed from helicopters are to be used on the cotton crops of Sudan. Pest Control (Sudan) Ltd. will use both British and American helicopters to apply Psylortox, its DDT emulsion.

•

New Pool: Specified Finishes, Inc., Chicago, is one of the three latest "production pools" authorized by the Defense Production Administration. The pool is composed of seven Chicago area companies, producing coatings such as paint, varnish, enamel, lacquer, oil and adhesives. It is the eleventh pool authorized during the present emergency.

•

Like a Duck's Back: A melamine-based synthetic resin glue for water-resistant paper has been introduced in the East Zone of Germany. Work was done at the nitrogen plants at Piesteritz in Saxony where synthetic resin glues based on xylenols previously were developed.

•

D-Enamel Abroad: The New Process D-Enameling Corp., Aurora, Ill., is considering licensing its process overseas. D-Enameling is a method of refinishing damaged porcelain ware, which has had wide application since it has been available. Plans are to grant the process to one company exclusively in a country.

•

Drug Combination: Winthrop Stearns has introduced a new medicinal preparation, Cilfomide, containing crystalline penicillin G potassium, sulfadiazine, sulfamerizine, and sulfamethiazine. Available in flavored powders and tablets.

•

Wood Stain: Sapolin Paints (New York) has developed Waxed Effect Stain to "give a waxed appearance without rubbing and wiping." It is available in six colors.

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Cupric Nitrate, Purified, Crystal
Lead Acetate, Technical
Lead Nitrate, Technical, Crystal
Magnesium Carbonate, Technical, Powder
Magnesium Oxide, Purified, Neoprene Grade, Powder
Mercuric Oxide, Technical, Red and Yellow Powder
Molybdic Acid, Purified, Powder
Nitric Acid, Technical
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Denatured—Do Not Eat

Popcorn for packaging is back again as chemical companies come up with practical methods for overcoming Food & Drug Administration objections.

Denaturant solutions, guaranteed to discourage anyone from eating, are ready to go; one has FDA approval already.

Big and little companies vie for market; the possibility of legal problems over patents looms.

Popcorn for packaging, which roared in on the wings of enthusiasm last year (*CIW, Jan. 20, '51*) and slunk out on the heels of FDA disapproval (*CIW, Apr. 7, '51*), is back again, alive and kicking lustily. Reason: Denaturing agents to render it inedible

BY-PRODUCTS' STIFEL: The worse its taste, looks, the better it is.

—one, from By-Products Processing Laboratories, Inc., already approved by FDA, and the other, from Winthrop-Stearns, well on the way.

Actually, of course, the idea was never dead, for Albert Rausch, Winthrop-Stearns' champion of popcorn packing, wasn't dismayed by FDA's attitude. Nevertheless, most chemical firms, and other shippers of fragile items, stepped softly after a warning from the Manufacturing Chemists' Association on the seriousness of FDA disapproval.

While Winthrop-Stearns set about finding ways to extend the use of popcorn in its shipping operations, and huddled with Carbide & Carbon Chemicals on some way to denature the popcorn, By-Products' president Max Stifel set his organization on the same trail, but with a head start. By-Products found itself out front by virtue of its chief chemist's having spent the previous year working on a similar problem: denaturing potatoes.

Kids and Connivers: FDA's glum attitude was based on popcorn's edibility. It pointed out that children could eat it after it had been used for packaging, and that unscrupulous customers could easily resell it as food after getting it as packing. On top of this, popcorn will rot, will attract rodents and vermin.

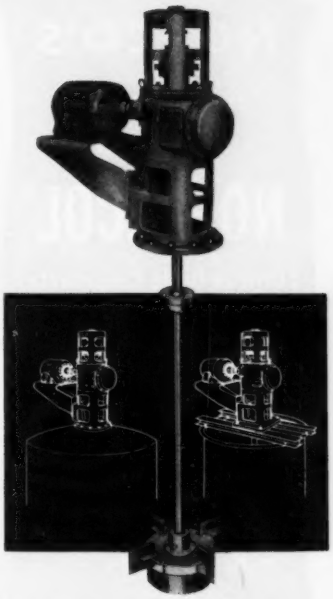
The answer was denaturing to render the popcorn inedible. At the same time it would be good to make it vermin- and mildew-proof, but Winthrop-Stearns doesn't think FDA considers this strictly necessary, although customers with warehouses full of popcorn might.

Hard To Please: But FDA is hard to please. Both companies started, apparently, with a base of sucrose octaacetate, which FDA thinks is fine as far as it goes, but it doesn't go far enough. From there on in By-Products isn't talking, and neither is W-S.

Two of the major demands of FDA, however, are immediacy of repellent action—the denaturant should work immediately upon touching the lips—and color. The latter is a tough nut. It was the last hurdle surmounted by By-Products, and W-S is still working on it. To be satisfactory the color must be repulsive enough so that no one will think the material is edible.

Recent approval of By-Products' formula ended a year's intensive work by the firm, with FDA rejecting formula after formula. As it stands now By-Products guarantees that its denaturant, marketed under the tradename Denopack, will make popcorn inedible, repulsive to humans and animals alike as soon as it touches the lips, and stabilize it against the attack of vermin and rot. It is, of course, nontoxic—an FDA requirement that went without saying.

Good As Ever: Denaturing doesn't change the valuable packing properties of popcorn in any way. All the features that made the whole thing



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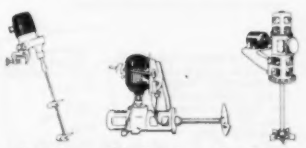

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worthwhile are still there: shock absorbency, resiliency, and non-compressibility; ease of handling; automatic filling; lowest volume weight; and comparatively low cost, all making popcorn nearly ideal.

In addition, popcorn for packaging purposes can be of the cheapest grade, unfit for consumption, broken, or even slightly moldy, since By-Products' claims its denaturant will take care of the mildew.

Both By-Products' and W-S's denaturants are liquids, can be applied by drumming or spraying. By-Products claims that its products can be applied to the corn while it is popping if the extra operation of application is not wanted.

At the present time By-Products has its denaturant in the pilot-plant stage, ready to go into full production on two weeks' notice. The company is working with Popcorn Service Co. to maintain a supply of popcorn on hand.

Patent Question: The one cloud on the horizon is the possibility of a patent battle. Both companies have filed patents on their ideas, both have these patents pending. Just what will happen, what can or can't be patented, who was first, etc., is at the moment obscure; but there could be something of a rhubarb even at this late stage of the game.

Small-Package Push

Dow's new publicity and retail distribution campaign for its Dowflake (Dow's version of calcium chloride) is out to make the average homeowner feel that life is hardly worth living without a 25-lb. bag or two around the house—and to make dealers clamor for the right to sell it.

The company was not satisfied with public cognizance of the value of Dowflake as a home dehumidfier in summer, and the enemy of icy walks and driveways in winter. Now that summer is coming, Dow is singing loud the praises of "the ever-thirsty chemical" for "moisture control at home."

Distributors Polled: As its first step in the glamorization of Dowflake, the company asked its regular distributors to supply the names of all the retail outlets in their area who supply 25-lb. bags. Armed with the resulting six thousand names, Dow was ready to put the show on the road.

Taking the path of direct mail, Dow contacted all six thousand retailers on its list. With the pep-letters went samples of window banners and consumer literature available from Dow. The retailers were informed of the national advertising planned for them in *Better Homes and Gardens*, and of the preparation of newspaper mats so that the dealer can do local newspaper advertising if he wants to.

By the time all and sundry are mopping necks and muttering, "It's not the heat, it's the humidity," Dow will have released illustrated consumer stories to the newspapers on a national scale. Along with the yarn will go a list of retail outlets in the paper's area for the use of telephone answering services—and for help to the retailer.

All this is by way of assuring the dealer that Dow won't sell him and forget him, but will give help in making the public pant for Dowflake. Another important assurance from Dow to dealer is that the supply will be more than adequate for the entire summer. This is important since retailers don't like to be out of something when the cash is on the counter.

Package Deal? In its literature to dealers Dow admits that the ideal way to sell Dowflake would be in a package deal with the home unit necessary to hold the calcium chloride. But since this is not in the cards at present, Dow is doing the next best thing by recommending that the units and bags be displayed together. To further this project the company is telling dealers where to find the various dehumidifier manufacturers, and is cooperating with some who are running coincident national campaigns.

In its literature to retailers Dow pictures many dehumidifiers, with prices, and generally attempts to service the dealer by indicating the many types available.

Results Plus: The deal seems to be working better than expected. Dow's small-package sales are heavier to date than in any other year in the past. Polo Plastics, a dehumidifier manufacturer, already is claiming volume sales of its product. Generally the plan seems to be paying dividends in an area where competing products are normally equal.

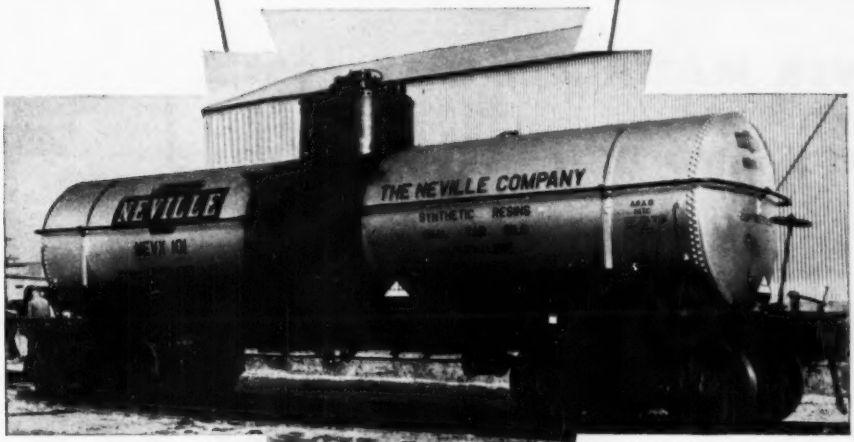
•

Branch Warehouse: A branch warehouse and sales office has been opened in St. Louis by Quaker Rubber Corp., division of H. K. Porter Co. The stock: industrial rubber products.

•

Sales Representatives: Rogers Corp., manufacturer of plastics and other fibrous materials for special applications, has established new sales representatives in Cleveland, Chicago and Columbus.

from OUR PLANT to YOURS



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A-41

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GC52-2

Germicidal or Surface-Active?

New experimental results hold the promise of a market for surface-active agents in animal feed supplements.

Fatty acid derivatives—even household detergents—have produced favorable responses in feeding trials. Cost-wise they would offer marked savings over antibiotics currently in use.

But only theoretical significance can be attached to the work at this time; commercialization is nowhere in sight.

Antibiotic producers would have good cause for casting an apprehensive glance at their livestock feed supplement markets. There's a threat on the horizon. Admittedly, it's a long way off. But that it's discernible can't be argued.

Evidence of that fact comes this week in the form of a terse statement from Armour and Co. (Chicago, Ill.). Armour says: "A first report from a test comparing a fatty acid derivative with an antibiotic indicates that the chemical is at least equal to the drug in putting weight on hogs."

The chemical in question?—an ethomid, one of Armour's nonionic surface-active agents used chiefly as a detergent and emulsifier. The antibiotic?—Aureomycin. The test?—one of a series run by researchers R. W. Luecke, J. A. Hoefer and F. Thorp, Jr. at Michigan State College agricultural experiment station, East Lansing, Mich.

Four groups of young Yorkshire hogs were the subjects. To one was fed a standard ration of corn, meat, bone scraps, soy meal, minerals and vitamins. The second received the standard ration plus a small amount of the ethomid. The third was fed the standard ration plus Aureomycin. Standard ration plus ethomid and Aureomycin was fare for the fourth.

Here's what happened: The first group gained 1.1 pounds a day per hog. Both the second (ethomid) and the third (Aureomycin) groups registered a gain of 1.29 pounds a day per hog. The weight gain of the combined fourth group averaged somewhere between the two previous figures.

Apart from strictly quantitative data, the test pointed up some interesting differences in the mode of response to the experimental agents. Weight gain from Aureomycin, for example, showed up almost immediately; the ethomid-derived benefits were slow in starting. But while the Aureomycin-induced gain eventually leveled off, the ethomid gain seemed to pick up momentum as the experiment progressed.

Moreover, the intermediate weight-response of the fourth group (which received both antibiotic and ethomid) also was somewhat of a surprise. A comprehensive explanation of this result hasn't yet been attempted. But it's pretty clear that some sort of antagonism is operating.

Amounts of ethomid and Aureomycin supplement used in the feeding test were the same: 1.5 pounds per ton of feed. That's about the same dosage level employed in commercial Aureomycin supplements. But the story on cost is quite different. Lederle Laboratories' two straight Aureomycin supplements (no guarantee of vitamin B_{12} content), containing 1.8 and 3.6 grams of the antibiotic respectively, sell for 38¢ and 54¢ a pound in carload lots. Ethomid is priced at 50¢ a pound.

Cheaper by the Ton: Offhand, the antibiotic would appear to be very much in the price race. But one vital factor has yet to be considered: Ethomids are experimental chemicals. Cost would take a substantial dip if and when production is in bulk.

Armour makes its ethomids from relatively inexpensive raw materials at the company's McCook, Ill., plant. Fatty acids are converted to their amides and reacted with ethylene oxide to give the final product. The actual ethomid used in the Michigan State experiments comes from coconut oil, is formed by reacting 15-carbon fatty acids with ethylene oxide in a 1 to 5 molar ratio.

Armour figures that a price in the neighborhood of 10¢ a pound would not be out of line for ton lots of the chemical. And that's the key to the ethomids' market potential.

At this stage, potential is about all the ethomids have in the field of livestock feed supplementation. The whole idea is still in the research stage. But in that light, it's highly significant. For the work at Michigan State promises to clear up some of the mystery attached to the question of how feed supplements do their beneficial work.

MICH. STATE'S LUECKE: Fuel for a debate.

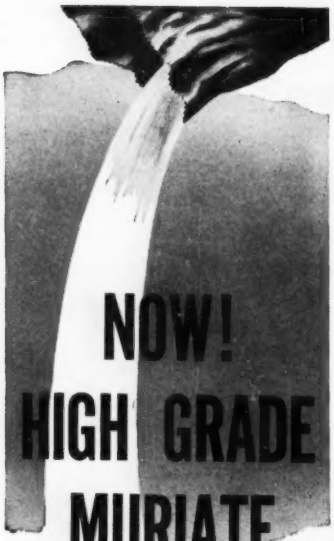
As a matter of fact, the current ethomid research is part and parcel of a well-conceived approach to this problem. Although no one has gone all the way out on a limb to explain the mechanism of action of antibiotic supplements, germicidal activity seems logical as a working theory. The idea is that the antibiotic alters the intestinal bacteria and controls subclinical infections of the intestine so that the animal is better able to utilize its food intake.

Recently, however, the observation was made that the successful supplement antibiotics all appeared to have structural features which are associated with surface activity. The possibility was pointed out that wetting action, by permitting more effective intestinal absorption of nutrients, was the real reason for the antibotics' growth-promoting effect.

Case Still Open: To test this assumption, the Michigan State group—headed up by R. W. Luecke—set up their experiment. Although their results are favorable, they are more a guidepost for future research than a conclusive argument for the surface-active theory.

In all fairness, no one test can be taken as conclusive proof. In this respect, the Michigan State researchers are probably above reproach; advance publicity is a more likely culprit.

Then too, the question of feed efficiency of the ethomid as compared to that of the antibiotic has not been



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touched upon in the test results.

But the work of Luecke and his group is backed up in part by the results other researchers have obtained. At a recent conference of the Distillers Feed Research Council in Cincinnati, C. M. Ely of National Distillers Products Corp. reported positive growth response with detergents in 60 experiments on 3,500 chicks.

Although Ely's results unquestionably demonstrate the beneficial effect of the detergents, they still do not constitute air-tight proof of the surface-active theory. There is always the possibility that the detergent itself is germicidal in effect.

A lot of research still lies ahead. Until the final returns are in from the laboratories and agricultural experiment stations, the question—germicidal or surface-active—will continue to be a lively topic of debate in the feed supplement business.

Three Steps to the Mold

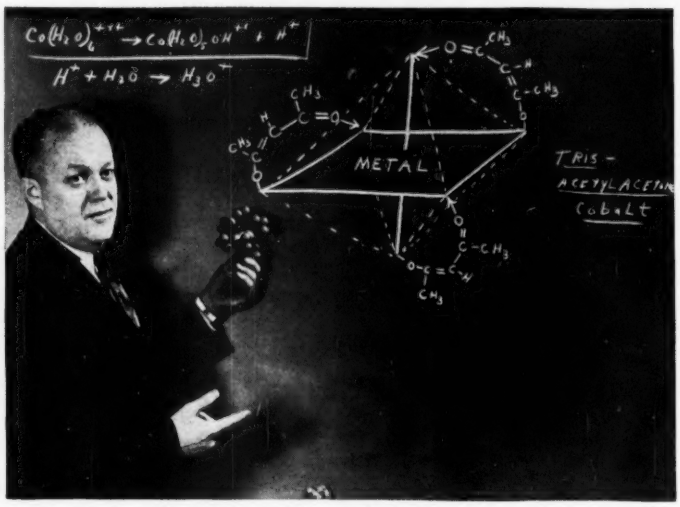
A new method of foaming Vinylite plastisol, developed by Elastomer Chemical Corp. together with Bakelite Co. Div. of Union Carbide and Carbon Corp., produces a material that looks like foam rubber.

But according to Bakelite, that's where the resemblance ends. The foamed plastic is reported to have better flame and chemical resistance than its rubber counterpart. And it's easier to fabricate. Cost is said to be comparable to fabricated foam rubber.

Flexibility; light weight; and resistance to aging, moisture, abrasion and tearing are added selling points. But ease of production should have most appeal to potential manufacturers. The foaming process takes no high-pressure equipment, is done in three stages at low temperature.

The Trick: Here's how it's done: The liquid Vinylite plastisol formulation is poured into a pressure cylinder. Gas under 400 lbs. pressure is introduced to expand the liquid. The cylinder is sealed and agitated. That's all there is to it. Forced out by gas pressure, the expanded material is ready for the mold.

Temperatures between 225 and 275 F, available in an ordinary oven, are used for curing. A simple, hand-cranked pressure cylinder, costing less than $200, is all that's needed to expand 25 lbs. of the foam.



Model of Coordination

DOUGLAS G. NICHOLSON of Fisher Scientific Co.'s educational department demonstrates model of the tris-acetylacetone cobalt complex made with Fisher's new metal-coordination atom model kit. An innovation in three-dimensional representation of chemical structure, the new apparatus permits accurate reproduction of molecules and ions held together by coordination bonds (i.e. only one atom contributing electrons). Previous structural models only portrayed organic molecules made up of covalent (or shared) bonds.

Large Order: Australian researchers are eyeing whale pituitaries as a new source of ACTH.

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Cottonseed Vitamin: Research by Benjamin D. Deacon of Texas Engineering Experiment Station in cooperation with Cotton Research Committee of Texas shows cottonseed oil to be a valuable source of vitamin E (α-tocopherol). Concentration of the vitamin in cottonseed oil is higher than that in wheat germ oil, one present commercial source. Cottonseed oil concentrates, containing up to 1.14% of vitamin E, were obtained by molecular distillation.

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Debut: Add Hampel-Modjeska Laboratories to the roster of Chicago-area consultants. The new organization specializes in electrochemical and electrometallurgical processes and products, will conduct research and development as well as technological and economic evaluations for industry and Government.

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Foreign Fiber: Research dating back to 1934 will shortly come to fruition for the German firm Cassella-Farbwerke-Mainkur. Cassella is slated for commercial production of its Pan polyacrylonitrile fiber in the near future. Foundation for the new fiber development is the work of former I. G. Farben researchers Rein and Zerweck. The polyacrylonitrile program at Cassella is apparently independent of similar enterprises at other German firms.

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Copolymer Confab: "Copolymers in Surface Coatings" will be the subject of a symposium at Polytechnic Institute of Brooklyn slated for April 9. Sponsored by New York Paint & Varnish Production Club, the meeting will hear from representatives of American Cyanamid Co., Carbide & Carbon Chemicals Co., Monsanto Chemical Co. and Kienle & Co.

•

Fungicide Assay: A simple, quantitative technique for the laboratory assay of fungicides is the news from researchers at University of Pennsylvania. Briefly, here's how it's done: Sterile filter paper discs, 13 mm. in diameter, are dipped into the fungicide. Excess liquid is drained off and the disc is placed on the surface of a fungus culture in a Petri dish. Four discs, each saturated with a different concentration of fungicide are added to each dish. Zones of inhibition are determined after two or three days.

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Going Up: An insight into Du Pont research comes from the company's

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RESEARCH . . . . . .

latest annual report. Research expenditures during 1951, excluding cost of new facilities, totaled $47 million—compared with $38 million for 1950. Currently, it costs about $24,000 annually to maintain one researcher and involves an average investment of over $30,000 in laboratory facilities. The company's laboratories house a research staff of more than 1,900.

The bulk of Du Pont's research effort is aimed at improving the competitive position of its products and processes, developing new products and processes. But as total research expenditures have increased, greater emphasis has been placed on fundamental and long-range projects.

•

Now Intravenous: Researchers of Chas. Pfizer and Co. have developed the first terramycin preparation suitable for intravenous injection. It's a mixture of ten parts terramycin hydrochloride and nine parts sodium glycinate.

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New Growth: A new $100,000 installation at Vancouver marks another step in Monsanto Canada Ltd.'s research expansion. It's Monsanto's third major project in western Canada within the last four years.

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Pyridine Patent: Allied Chemical and Dye Corp. has recently been awarded a patent (2,556,845) on the preparation of monovinyl pyridines by heating activated pyridine compounds with formaldehyde and a basic catalyst. Good yields of 4-vinyl pyridine and 4-picoline are obtained with the new process.

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Molded for Strength: Three new rubber-modified styrene formulations now are available from Bakelite Co., Div. of Union Carbide and Carbon Corp. Bakelite calls them QMS-151, -152, and -155, says they are easily molded or extruded into impact-resistant plastics with good electrical properties and the chemical resistance of styrene. High strength in thin cross-section is a strong selling point.

•

Low Pressure Firm: Vacuum Metals Corp. has just been organized as a wholly-owned subsidiary of National Research Corp. The new company will undertake commercial development of high vacuum-melted and -cast metals. National Research Corp. pioneered vacuum processing of metals, is the principal manufacturer of vacuum furnaces used in this field. Its subsidiary will shortly be in operation at Cambridge, Mass. with a production capacity of about five tons a day.

Rare Earths Arrive

Nichols Medal, given to Iowa State's Spedding, points up big strides in rare earths.

This may be the year for rare earths, says Spedding; they can fizzle or blow up big.

Cerium, cheapest and most abundant, is finding a market in alloys of steel, magnesium.

FRANK SPEDDING: Little atoms from big ones sparked his interest.

Ever since the introduction of the atom bomb, interest in the rare earths has perked up, for they are found in large quantities as by-products of uranium fission. Moreover, thorium—not a rare earth but found closely associated with them in nature—is itself fissionable and may prove an important source of atomic energy.

Just two weeks ago (March 14), the New York Section of the American Chemical Society gave its coveted William H. Nichols award to Frank Spedding, director of the Ames Laboratory of the Atomic Energy Commission at Iowa State College, for "outstanding contributions to the constitution, properties and chemistry of the rare earth and actinide elements." In a way, the award was a recognition of the chemical importance of the rare earths, and last week, to find out the present status and commercial potential of the rare earths, CHEMICAL WEEK interviewed Frank Spedding.

Boom or Bust: Spedding thinks that the coming year may well tell the story on rare earths. Says he: "Within the year, interest in them could either fizzle out or blow up into something really big." According to Spedding, one thing seems certain: For the next five or ten years, they are sure to get a lot of attention from researchers.* But they have many commercial applications even at their present high cost. With improved production techniques and a resultant drop in costs they are destined for more important roles as industrial metals.

Spedding and his colleagues at Iowa State have already made important contributions to processing techniques in the rare earth field. Separation of the ores, for example, has always been a tedious, time-consuming problem. Commercially, it is done by either fractional crystallization or solvent-solvent extraction. Spedding and his team worked up an ion-exchange method using a citric acid solution of the rare earths. But though the method is faster and more efficient, at least one commercial producer says it is too expensive at present for anyone except the AEC.

Another important contribution: separating the primary metal from the intermediate salt. Instead of an electrolytic reduction, Spedding and the others have come up with a calcium reduction of the rare earth halide.

One of the difficulties they overcame was in the formation of the halide. At first, expensive ($5-$10 each) tantalum crucibles were employed, but Iowa State's Adrian Daane devised a method of joining a tissue-thin film of tantalum to a bucket. Although the lining is not suitable for reuse—as is the straight tantalum crucible—joining costs are only 40¢.

With the calcium reduction, Spedding says that it is possible to turn out high-purity cerium, lanthanum, neodymium and praseodymium in good yields. In the process, iodine is used as a booster since it reacts exothermically with the calcium, and since high temperatures promote separation of the metal from the slag. A vacuum distillation reduces the two principal impurities (calcium, magnesium) to less than 200 ppm. each.

Spedding figures that processing costs alone for the calcium reduction will run about $15 a lb. for small quantities but would come down to $10-$12 for 100 lb. lots, $2-$3 for tonnage lots.

Who's Who: Currently, there are three firms producing basic rare earth salts. Of the three, Lindsay Light and Chemical (Chicago) is the biggest, Maywood Chemical Works (Maywood, N. J.) second. Between them, they probably account for 95% of the production in this country. Rare Earths (Paterson, N. J.) produces the rest.

The G. Frederick Smith Chemical Co. (Columbus, Ohio) sells a variety of rare earth salts but starts with material from the three primary producers. And Molybdenum Corp., with its recent acquisition of rich raw material deposits in California, could conceivably be a big producer.

Several firms purchase the salts to extract the primary metals. Cerium Corp. (New York City) has pioneered the production of cerium and cerium alloys (chiefly mischmetal) and is the biggest factor in its field.

All those concerned with rare earth production agree that there is a bright future in store but all have been hampered by a shortage of raw material. Originally, monazite was imported from India; but when word got around that thorium, which makes up 9% of Indian monazite, is fissionable, the Indian government slapped an embargo on exports. Then material was imported from Brazil until the Brazilians also put an embargo on their monazite. Now, the companies depend on domestic monazite in Florida and Idaho, are all eagerly watching Molybdenum and its deposits.

Major Markets: For years the big market for thorium was thorium nitrate used in the manufacture of gas mantles. Apparently Lindsay Light is still doing a thriving business for it exports 10-15 million gas mantles for 3-4¢ each, sells another one or two million in this country.

Principal markets for the rare earth metals and salts:

- Cerium and mischmetal: Cerium is the most common—and cheapest—rare earth. Its biggest market—as mischmetal—in the past has been in cigarette lighter flints but other markets are opening up. Cerium Metals, says that magnesium-zirconium-cerium alloys for jet engine parts could easily be the biggest market.

* The rare earths differ only in the number of electron in an inner (4f) orbit. They all have three in the outer one, hence their chemical activities are practically identical. Difference in properties is due only to a slight difference in densities of the atoms because of the variations in positive charges on the nucleus. That means they will be fertile proving grounds for various theories of physics and physical chemistry.

Cerium has been used successfully in the fabrication of other metals. Carpenter Steel, for instance, has patented a process for incorporating cerium in stainless steel production and other companies—including Republic Steel, Bethlehem Steel and Molybdenum—are reportedly working along similar lines.

Spedding says that the addition of one or two lbs. of cerium saves $80 on fabricating costs of some types stainless. A similar amount added to magnesium doubles its high temperature strength and makes it more competitive to aluminum.

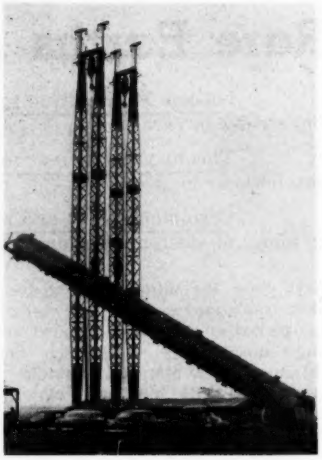
The AEC now buys a special glass containing a cerium salt from Pittsburgh Plate Glass for use is expensive microscopes and periscopes. Because the glass doesn't darken on exposure to radiation, it can be used in "hot" chambers. AEC is ordering about $1 million worth of the glass from PPG this year. For Lindsay, suppliers of the salt, it adds up to about $250,000 worth of business.

Cerium oxide is used as a polishing agent in lens grinding, has about replaced rouge formerly used for the purpose. Ceric ammonium nitrate is employed as a scavenger in the production of explosives.

• Lanthanum: Lanthanum oxide was introduced during the war for highly refractive lenses used in aerial photography. Eastman Kodak and others are now putting it into all quality lenses. (Thorium oxide is also used as a lens ingredient).

• Neodymium: Neodymium has been used in radio condensers since World War II, is also employed in the manufacture of colored glass.

• Others: Gadolinium is ferromagnetic at high temperature but loses the property when cooled to 16 C. Spedding points out that could make it useful in fire alarm instruments. And any or all of the rare earths are potential catalysts for oil cracking. As with everything else, more markets will open up when the price comes down.



Lend Lease Bonus

ORIGINALLY BUILT for a refinery in Soviet Russia, this 157-ft., 200-ton distillation tower will soon be making aviation fuel components at General Petroleum's Torrance (Calif.) refinery. A Lend-Lease shipment was cancelled in 1945 and the tower remained idle until company engineers, faced with a steel shortage, uncovered it, adapted design for their own use.

Nylon Ride for Paper

To the paper trade last week came a welcome piece of news. F. C. Huyck & Sons (Renssalaer, N.Y.) reported that a "highly satisfactory" run had been made on a paper machine using an all-synthetic felt. Reportedly made of nylon, the felt was developed by Huyck researchers; the run was made at the Camas (Washington) mill of the Crown Zellerbach Corp.

The papermakers' felt is a moving conveyor or belt on fast-running machines and plays an important role in paper manufacture. In paper processing, raw paper stock—"milk"—flows onto a wire mesh belt. Water from the milk passes through the mesh leaving a thin film of white stock, which is actually a sheet of paper. After the sheet is thus formed, a woven fabric conveyor belt picks up this wet, fragile sheet from the wire mesh belt and carries it through the machine. The felts are threaded over the rolls of the machine and the paper sheet is finished.

GRENVILLE HOLDEN: Optimism seasoned with caution.

Since earliest days, the felts have been made of wool fibers. Although in the last few years blends of wool and synthetics have been used for certain jobs, the consensus of opinion was that all-synthetic felts were impractical.

Need for Speed: Papermakers have long recognized the fact that the quality of the paper depends to a large extent on the running qualities of the felt. One of the troubles with woolen ones is that soft pieces wear away from the fabric and leave holes. And light or heavy spots due to faulty weaving cause the felt to plug up. That means the felt will fail to filter properly and the sheet of paper will break. Furthermore, weak joinings in the woolen felts are liable to break apart under tension and result in damage to the paper and down-time for the machine.

The drawbacks of woolen felts became more apparent with the advent of modern, high-speed paper machines; for as bigger, faster machines were made, it became necessary to develop felts tough enough to stand up under the heavier beating.

Policy Departure: Huyck, a self-styled "woolen textile mill" (Kenwood blankets) and a pioneer in the manufacture of papermakers' felts, saw the need, decided to do something about it. The all-synthetic felt is the result of a long-term research program involving many synthetic fibers and manufacturing techniques. And although the company is unwilling to disclose the nature of the fiber, it's a safe bet that it's nylon.

Huyck President Grenville Holden calls the new felt "a significant development for the papermaking industry and a great advance in felt manufacture." He says the synthetic felt ran considerably longer than a woolen felt would have under the same circumstances and describes its performance as superior from the standpoint of water removal, running qualities and resistance to frictional wear. And he is quick to point out that the synthetic fiber is immune to attack by bacteria, a common cause of short felt life.

Holden foresees higher operating speed for paper machines as a result of the new felt, but seasons his optimism with a certain amount of caution. He says production techniques for making the felt are still in the developmental stage. He feels sure

that it will be used on a number of different types of paper and paper machines, but is not ready to say that it will be applicable in all cases.

EQUIPMENT. . . .

Teflon Insulation: Du Pont's Wilton A. Hawkins has just described his company's latest technique for covering certain electric conductors with insulating Teflon. In a conference of the Society of the Plastics Industry, Mr. Hawkins described the process, known as three-dimensional calendering, as involving feeding a series of bare wires, together with Teflon powder, into the nip of two calender rolls which have been grooved to allow passage and to provide the pressure required for cold-forming the coating. The coated assembly is then fused at about 750 F in a sintering oven and after trimming, the wire, coated with a 15 to 50 mils of Teflon, is separated and reeled.

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New FHP Motors: General Electric is introducing a new line of fractional horsepower motors of new concept and design. Known as "Form G", the new motors are said to weigh up to 51% less per horsepower than others of conventional design and are considerably smaller in size. For use on pumps, blowers, compressors and appliances, these motors are available in open drip-proof and totally enclosed fan-cooled models in polyphase, capacitor start, split phase and permanent split capacitor types. The design incorporates G.E.'s new insulation system consisting of nylon combined with Formex wire and Glyptal varnish. Form G motors are said to be the only ones of this type recommended for all-angle operation. To be offered in a complete range, the motors permit installation of maximum power in minimum space.

•

Indicating - Controlling Pyrometer: Wheelco Instrument Co. is now offering a compact, direct reading, indicating pyrometer controller. This controller is offered as a relatively inexpensive means of control for furnaces, kilns, plastic molding equipment, etc. The incorporated Lineotrol feature of the new Model 293 Capacitrol automatically reduces to a minimum the "on" and "off" variation to achieve closer temperature control. Model 293 is available in a wide range of scales using various thermocouples.

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Automatic Sampler: Denver Equipment Co. has acquired manufacturing, sales rights to the GECO Sampler, formerly made by Heginbotham Equipment Co.

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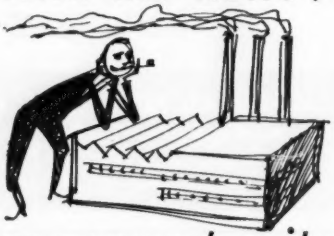
in industry 

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BOOKS . . . . . .

Chemical Calculations, by Sidney W. Benson. John Wiley & Sons, Inc. New York N.Y.; 217 pp., $2.95.

An elementary book with the purpose of introducing the student to the mathematical thinking which enters into chemistry.

Industrial Process Control by Statistical Methods, by John D. Heide. McGraw-Hill Book Co., Inc., New York, N.Y.; ix+297 pp., $6.

Manual covers phase of industrial statistics which pertains to the direct control of the industrial process. In explaining programs of statistical quality control, the author stresses practical and administrative problems as well as the statistical concepts involved.

Vinyl and Related Polymers, by Calvin E. Schildknecht. John Wiley & Sons, Inc., New York, N.Y.; xi + 723 pp., $12.50.

Book covering experimental, practical and commercial aspects of polymers, stresses chemistry of polymerization and polymers, basic discoveries, methods of preparation, and advantages and limitations of products.

MEETINGS . . .

Packaging Machinery Mfrs. Inst., semi-annual meeting, Dennis Hotel, Atlantic City, Mar. 30-31.

Amer. Chem. Soc., national meeting, Milwaukee, Mar. 30-Apr. 3.

Natl. Packaging Exp., Atlantic City Auditorium, Apr. 1-4.

Tech. Societies Council of N.Y., atmospheric pollution meeting, Statler Hotel, Keystone Room, N.Y., Apr. 4.

Natl. Agr. Chemicals Assn., spring meeting, Fairmont Hotel, San Francisco, Apr. 6-9.

Amer. Pharm. Manuf. Assn., annual meeting, Boca Raton Club, Boca Raton, Fla., Apr. 7-9.

Amer. Soc. of Lubrication Engineers, annual meeting & lubrication show, Statler Hotel, Cleveland, Apr. 7-9.

Soc. of the Plastic Ind., annual conf., Edgewater Beach Hotel, Chicago, Apr. 9-11.

Amer. Zinc. Inst., annual meeting, Statler Hotel, St. Louis, Apr. 21-22.

Assn. of Consulting Chemists & Chem. Engrs., general symposium, Belmont Plaza Hotel, N.Y., Apr. 22.

Amer. Ceramic Soc., annual meeting, Pittsburgh, Apr. 27-May 1.

Amer. Oil Chemists' Soc., annual meeting, Shamrock Hotel, Houston, Apr. 28-30.

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Fig. 2107—Flanged end O. S. & Y. "Y" Valve for 150 pounds W. P. Can be furnished in various corrosion-resisting metals and alloys with bolts and nuts in stainless steel. Flange dimensions and wall sections conform to all the latest standards. Sizes ½" to 2", incl. Also available with screwed ends.

Because Powell Valves are engineered to meet the specific conditions under which they must operate, they have an established reputation for long, dependable performance with minimum maintenance.

In addition to complete lines in Bronze, Iron and Steel, Powell makes valves in the greatest variety of Corrosion-resisting Metals and Alloys ever made available to the CHEMICALS and PROCESS INDUSTRIES

Fig. 2491—150-pound O. S. & Y. Gate Valve. Supplied with precision-fitted, quickly interchangeable solid or split wedges. Stem is threaded and guided through revolving bushing in upper yoke which has a compression lubricant fitting. Made in a variety of corrosion-resisting metals and alloys. Also available with screwed ends. →

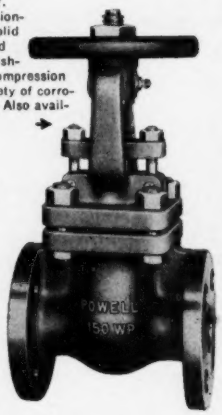


Fig. 2309—Small Flush Bottom Tank Valve with disc rising into tank to open. Sizes ¾" to 3", incl. Also made with disc lowering into valve (Fig. 2310). Sizes ½" to 3", incl. Other designs available in sizes 4" to 8", incl. ←

DEPENDABLE VALVES SINCE 1846

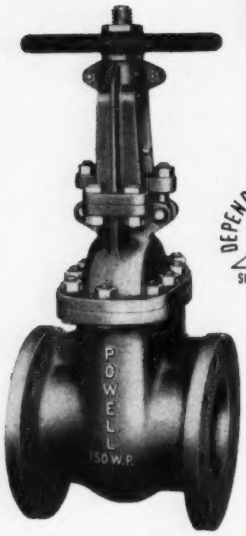


Fig. 2453 S. G.—Large 150-pound O. S. & Y. Stainless Steel Gate Valve with precision-fitted, accurately guided solid wedge. Can also be furnished with split wedge. Made in sizes 5" to 30", incl., with separable yoke arms. This valve conforms to all the latest standards. Available in a wide selection of other corrosion-resisting metals and alloys.

Bell-O-Seal "Y" Valve. Designed for high vacuum service and for handling hazardous, lethal, or malodorous fluids. Flexible metal bellows, enclosed in the body, completely seals interior of valve from outside atmosphere. Streamline design provides full flow area through valve. Made with flanged, screwed, or welding ends in a variety of corrosion-resisting metals and alloys. Bell-O-Seal Globe and Angle Valves also available.

POWELL VALVES for CORROSION-RESISTANCE are available in the following metals and alloys

Stainless Alloys
18-8S
18-8S Mo.
18-8S Cb.
Misco "C"
Durimet 20
11.5-13.5% Cr. Iron
18% Cr. Iron
28% Cr. Iron
25% Cr. 12% Ni.

Alloy Steels
Carbon Steel
4-6% Cr. .5% Mo.
3.5% Nickel Steel
6-8% Cr. .5-.75% Mo.
8-10% Cr. 1.1-1.5% Mo.

Nickel and Nickel Alloys
Nickel
Monel Metal*
Inconel*
Hastelloy Alloys† (A, B, C and D)
Illium
D-10

Cast Irons
Cast Iron
3% Nickel Iron
Ni-resist*

Hard Lead

Bronzes—Acid, Aluminum, Silicon
Everdur
Herculoy
Ampco
Ampcoloy
76
90-10
88-10-2

Aluminum
Alcoa No. 43
Alcoa No. B-214
Alcoa No. 61 S-T

Molybdenum

Silver

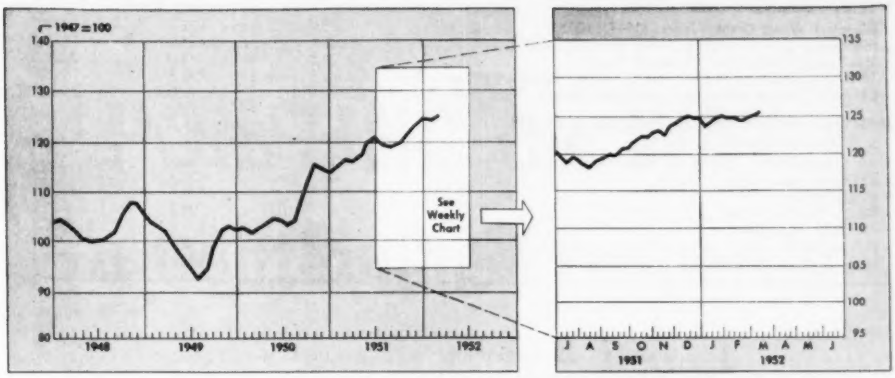
*Registered trade-names of the International Nickel Co., Inc.

†A registered trade-name of the Haynes-Stellite Co.

POWELL VALVES

The WM. POWELL CO., 2525 Spring Grove Ave., P. O. Box 106, Station B, Cincinnati 22, Ohio

MARKETS . . . . . .



CW Index of Chemical Output—Basis: Total Man Hours Worked in Selected Chemical Industries

MARKET LETTER

Restricted sulfur consumption under current order M-69 (amended) is just on a par with supply. Customers will find supply improvement gradual for the next year.

But after that new Frasch-minable domes will come in, help relieve the long-standing shortage. Production goals: 7 million tons annually by the end of 1953, and 8.4 million tons by the end of 1954.

More dissolving pulp will soon be going for export unless demand picks up. These grades are used in the manufacture of rayon, cellophane, and nitrocellulose, all in various stages of lessened activity.

To relieve the imminent surplus, additional chemical outlets are being explored by the pulp companies. Examples: ethyl chloride, water-soluble gums.

A sizable boost for the dry ice business may be shaping up. New use: in refrigerated transports. In one recent run with this refrigerant, a truckload of frozen food was carried from Cleveland to Jersey City without re-icing. There was a temperature rise of only 1.7 degrees on the 500-mile trip, well within the shippers' allowable limits.

Another in the succession of price cuts in antibiotics feed supplements took place this week. Commercial Solvents made three substantial reductions in bacitracin-type supplements (ton lots): Bacitracin supplements went from 75 to 54¢ a pound; bacitracin-B_{12} came down from 84 to 63¢ a pound; and the newly-created bacitracin-penicillin combination dropped to 80½¢ from its introductory level of $1.08.

Some cheer and some gloom cover the supply prospects for aerosol insecticide packagers. Supplies of most insecticides are adequate, and more is expected to come their way by easing of restrictions.

On the darker side: still critical shortages of methylene chloride, not enough brass valves.

Two demands—fuel and petrochemicals—keep pushing LPG hydrocarbons to new record output. Production in the last year was up by a quarter over 1950. Biggest use for LPG is still in household, farms, and direct motor fuel.

But petrochemicals, in second place, are coming up fast. Chemicals and intermediates took about 750 million gallons, synthetic rubber another 344 million gallons last year.

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Week Output Index (1947=100)	125.1	125.1	118.5
Bituminous Coal Production (Daily Average, 1000 Tons)	1,628.0	1,653.0	1,664.0
Steel Ingot Production (Thousand Tons)	2,131.0	2,114.0	2,021.0
Stock Price Index of 14 Chemical Companies (Standard & Poor's Corp.)	233.3	235.7	220.4
Chemical Process Industries Construction Awards (Eng. News-Record)	$6,450,000	$8,316,000	$2,719,000

MONTHLY INDICATORS—WHOLESALE PRICES (1947-49=100)	Latest Month	Preceding Month	Year Ago
All Commodities (Other than Farm and Foods)	114.3	114.3	117.2
Chemicals and Allied Products	106.0	106.7	112.6
Industrial Chemicals	117.5	118.1	120.5
Drugs, Pharmaceuticals, & Cosmetcs	93.7	94.8	95.9
Fertilizer Materials	109.6	109.4	105.4
Oils and Fats	51.2	56.8	123.4
Paint & Paint Material	109.0	109.3	109.4

Less than half of oxygen and hydrogen peroxide production will go to the chemical process industries. By the end of 1954, peroxide output will be about 45 million pounds yearly, double the capacity in January of 1951. Goal for oxygen is 34.6 billion cubic feet, a 50% rise in the same period.

Chemical use (e.g., hydrocarbon oxidation, bleaching) are growing fast, but not as fast as demand for its as rocket fuel, in making and fabricating steel.

Civilian industry will get the lion's share of larger elemental phosphorus capacity which is 98% completed or planned.

Biggest single outlet (mostly as polyphosphates): soaps and detergents builders. Fertilizer in second place takes 10-15%, would take much more if supply permitted.

Look for a trend to synthetic mullite to replace imported kyanite in heavy duty refractories used in steel furnaces and coke ovens. Imported material, of which 40% comes from India and Kenya, has been shrinking in quantity and quality, yet climbing in price.

Buying of foreign kyanite will be emergency purchases to meet the 25% boost in demand since last year and to help the stockpiling program.

A bigger choice of closures—and more of them—will be available to packagers soon. Most types will be in balance before year's end, some even earlier. Polyethylene will be eased by new production due the end of June, with a chance that controls will be jettisoned by October.

Aluminum supply for civilians will take longer because most of the early new production will be taken by the Air Corps and Atomic Energy programs.

Paint makers are having no end of trouble using tinless black plate for containers, want relief quick. Some troubles they've had: lining failures, plugs not seating right, and the need to spot weld cans for mail shipments. Chances are good their pleas won't be in vain.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending March 24, 1952

DOWN

	Change	New Price		Change	New Price
Beta-Phenylethylamine	$ .15	$1.10	Naphthalene, crude, imp.	$ .015	$ .09
Butyl Lactate, tanks	.15	.33	Phenylacetamide, 125-lb. drums	.15	1.10
Dioctyl Phthalate, tanks, frt. allowed	.0075	.40	Shellac, ref., bags	.01	.635

All prices per pound unless quantity is stated

POINTING the WAY To Continuing Prosperity

The set of figures in the middle of this page is news of high importance to every American.

In effect, it says that there is no basis in fact for all this talk about a collapse of capital expenditures plunging us into a depression following the industrial build-up for defense.

Such talk assumes that without defense orders business would spend relatively little for new industrial plant and equipment. The figures below show that that assumption is not justified.

The figures come from the fifth annual McGraw-Hill survey of business plans for new plant and equipment. Companies were asked to report through that survey not only their plans for 1952, but plans they now have in hand for capital expenditures in 1953, 1954 and 1955, provided the money to carry them out can be obtained.

A Record in '52

As was expected, their plans call for another record-breaking volume of capital expenditures by business in 1952. But, as many did not expect, the McGraw-Hill survey also discloses plans for very heavy capital expenditures in each of the three years following. Expenditures now planned for those years are, to be sure, lower than those planned for 1952. But the significant fact is not that they are lower. Experience shows that plans made several years ahead always overlook many expenditures that are needed later.

The significant fact is that the expenditures already planned for 1953-55 are so high. For example,

BUSINESS PLANS FOR NEW PLANTS AND EQUIPMENT (Millions of Dollars)

	Actual Spending 1950*	Actual Spending 1951*	McGraw-Hill Survey			
			Planned	— Preliminary Plans —		
			1952	1953	1954	1955
Manufacturing	7,491	11,141	12,921	10,028	8,525	8,194
Mining	684	806	943	415	321	358
Railroads	1,136	1,564	1,642	1,248	1,117	1,002
Electric & Gas Utilities**	3,298	3,676	3,948	3,360	3,204	2,748
Other Transportation & Communications	1,392	1,592	1,721	1,671	1,943	1,839
ALL INDUSTRY	14,001	18,779	21,175	16,722	15,110	14,141

*U. S. Department of Commerce
**_Electrical World_ (A McGraw-Hill publication) and American Gas Association.

those now planned for 1955 would be higher than those of 1950, which, at that time, were second highest in our history.

If these plans are carried out we shall have an essential element of continuing prosperity. Sustained expenditures for capital expansion and betterment account directly for a large share of our employment and consumer income. Moreover, consistent modernization of industrial plant raises production efficiency and brings more and better goods and services within reach of more consumers.

It is not to be expected, of course, that we can come down from the peak of the defense boom without readjustments in some sectors of business. But if capital expenditures by business are carried out on the scale now planned, we shall be able to take any necessary readjustments in our stride, and continue to increase our industrial strength.

From V-J Day to the end of this year, manufacturing industries will have spent over $60 billion for new industrial plant and equipment. This is more than the value of all the plant and equipment these industries had on their books at the end of World War II. It is this heavy outlay that causes some, assuming most postwar plans for industrial expansion and modernization will be completed, to fear a collapse of capital expenditure.

Plans to Go Ahead

But American industry still has plans to go right ahead expanding and improving its facilities. This was the most striking single finding of this year's survey.* It disclosed also that after 1952:

– 83 per cent of the companies answering the survey are planning substantial further modernization.

– 48 per cent will need more capacity to make their present products.

– 33 per cent plan additional capacity to make new products.

It cannot be too strongly emphasized, however, that these plans represent what American industry *wants* to do. They are a concrete expression of hope and aspiration. As such they are extremely important, for they dispose of the idea that business considers the job of expanding and improving its facilities as finished, or anywhere near finished.

But the plans carry no guarantee of accomplishment. If they are to be realized, business must have the funds to carry them out. There is no assurance that the money will be available if the present level of corporation taxes is continued. Eight out of ten companies, according to the McGraw-Hill survey, will rely entirely on profits and reserves to finance their 1953-55 programs. So, in calculating their programs for these years, the companies were asked to assume relief from "excess profits" taxation.

Federal taxes now take at least 52 per cent of a corporation's profits, and 82 per cent of any profits in the so-called "excess profits" bracket. Despite this drain on their funds, companies are able to finance their 1952 programs because (1) they are borrowing heavily, and (2) many of them are getting government loans or special tax concessions on new facilities installed for defense purposes. But these are emergency aids.

Only Two Ways

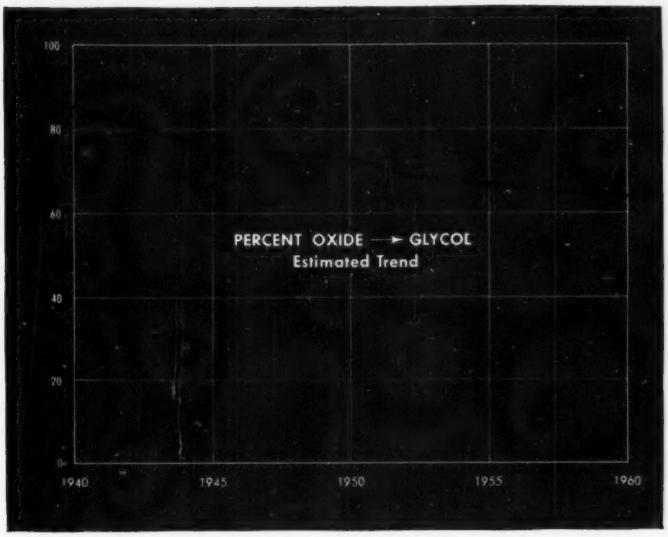
When the present defense program tapers off, there will be only two ways by which business can possibly increase its principal source of funds for new plant and equipment. One way is to make more profits before the tax collector takes his cut. And the only way many companies, already operating at capacity and high efficiency, can do that quickly is by raising their prices. That is an unpopular method. Also, with the return to more competitive markets, it might be self-defeating.

The other way is for the federal government to release its strangle hold on business profits. The so-called "excess profits" tax – the 82 per cent tax which is really a tax on business growth – should be repealed, effective January 1, 1953. And a cut in the basic tax of 52 per cent on all corporate profits should come not much later. That is by all odds the most important single step toward assuring that business plans already made for capital investment in 1953, 1954 and 1955 are carried out. It is the most important single step toward sustaining our present prosperity.

Through its plans for continued expansion and improvement of its facilities, American business clearly points the way to avoid the depression that so many have feared – and the Communists have so ardently hoped – would follow the peak of defense mobilization. It will be a tragedy for our country and for Americans in every walk of life if we do not insist that business get the chance to follow this wise and constructive course.

McGraw-Hill Publishing Company, Inc.

***Note – A copy of the full report of this survey can be obtained by addressing: Department of Economics, McGraw-Hill Publishing Co., Inc., 330 West 42nd St., New York 36, N. Y.**



ETHYLENE OXIDE: Glycol will grow but take a smaller share.

For The Sake of Oxide

More than a dozen applications to NPA for new ethylene oxide and glycol facilities are now pending.

Larger part of future oxide additions will go into non-glycol uses including ethanolamines, acrylonitrile, and nonionics.

Glycol supply for permanent anti-freeze nears balance with demand; further increase will parallel car registrations.

One of the more ticklish tasks facing NPA this week is deciding how much additional ethylene oxide and ethylene glycol capacity is needed. At least a dozen applications for each are up for consideration.

A second poser is no easier: deciding who should get the approval—and materials—to build. The outcome is being awaited with equal eagerness by hopeful applicants, by producers already in the business, and by the two new producers-to-be—Solvay Division of Allied Chemical and Hancock Oil. The latter expect to be in operation by the end of next year.

All of these interested parties are well aware that a new chapter is about to be written in the oxide-glycol story and that they are the ones to write it. For until this season, the major part of oxide (at least 70%) went to make glycol, and about the same percentage of glycol ended up as permanent anti-freeze. Moreover, anti-freeze demand up to now outran supply, and incoming producers knew they had a ready market.

But ethylene glycol for anti-freeze is rapidly catching up with the unsatisfied demand. That will force oxide producers to find other outlets such as ethanolamines, acrylonitrile, nonionics, and polyglycol ethers.

Oxide Wanted: Despite the unquestioned growth possibilities of these oxide derivatives, the path will be sprinkled with obstacles. Ethanolamines will probably have an easy time because they have many diversified uses and their unique properties are not readily found elsewhere. Dow Chemical, Carbide and Carbon Division of Union Carbide, and Jefferson Chemical are all expanding in ethanolamines, and part of Hancock's output will also go that way.

Ethanolamine products used in household detergents (such as Procter & Gamble's Joy) and in agricultural sprays should grow steadily, if not spectacularly. A more immediate spur to ethanolamine expansion is its use in extracting sulfide from sour refinery gas.

Fiber Divided: The potential for ethylene oxide in making acrylonitrile is greater, but competition with the

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acetylene process will be keen. The only present acrylonitrile producer—American Cyanamid—uses the ethylene oxide process.

But in the acrylonitrile boom that is now beginning, most of the fiber monomer will be made from acetylene over the next ten years. One of the largest to use this route will be Monsanto Chemical's a-building 50 million lbs.-a-year plant at Texas City, Tex. to make acrylonitrile for its Chemstrand affiliate. American Cyanamid is also planning to use acetylene in its project under construction in Louisiana.

Ethylene oxide nevertheless has some staunch support. Carbide will make acrylonitrile from ethylene oxide at Institute, W. Va. And some of those who would like to get into this business are looking with favor on the ethylene oxide provided they have an economical supply of hydrogen cyanide.

A reasonable estimate of acrylonitrile capacity might be 250-300 million pounds per year in the next ten years, with probably about one-third made from the oxide.

Others by Oxide: Ethylene oxide plays a necessary role in nonionic detergents, another field of promise, but here market development problems are compounded by the merchandising required. To advance in this area, the nonionics will have to buck stiff competition from market-entrenched products such as alkyl aryl sulfonates. P&G's product Tide is estimated to have over half of the packaged detergent business.

Besides this handicap, nonionics have another drawback: They don't make suds. Any campaign for packaged nonionics will require either a product modified to give suds or an educational program to convince the housewife she doesn't need suds.

So far progress has been uneven. P&G's anionic liquid detergent, Joy, has made inroads at the expense of Glim, the nonionic made by General Aniline and sold by Babbitt. But despite these initial setbacks, there is small doubt that the nonionics will make headway. Industrial detergents and automatic dishwashing are good customers now, and the hard-to-woo packaged business will be attracted with stronger sales strategy.

Polyglycols and polyglycol ethers should be in about the same class, volume-wise. Some prospects are considered sufficiently promising to expect a 100 million pound-a-year demand within the next ten years, more than double the present size. Carbide has been the pioneer in this development with Cellosolve and Carbitol solvents, water-soluble Carbowaxes, and Ucon synthetic lubricants.

Dow Chemical is in the process of expanding among similar lines, and others find the possibilities attractive. Two of the new, above-average prospects: synthetic lubricants for jet planes, high-boiling solvents for hot spray lacquers.

In Toto: Considering these foregoing prospects, the growth of ethylene oxide in the next ten years should be somewhat as follows:

Total Oxide Requirements (Million Pounds per yr.)

Use	1952	1962
Ethylene glycol (from oxide)	490	680
Acrylonitrile	50	100
Ethanolamines	40	80
Polyglycols and Ethers	60	90
Non-Ionics	30	80
Miscellaneous	40	80
Total	710	1,110

Government Needs

Bid Closing	Invitation No.	Quantity	Item
Commanding General New York Quartermaster Procurement Agency, 111 East 16th Street, New York, N. Y.			
Apr. 11	52-1274B	73478 lbs	Naphthalene technical flake
General Services Administration, 1114 Commerce St., Dallas, Texas.			
Apr. 3	FW-21487-A	2740 gal	Wax, water emulsion, interim Fed Spec W-P-151 B
	FW-21421	144 can 360 gal	Pigment in oil, GSA spec 826A Thinner, paint, TT-T-291A and amendment 1
Business Service Center, Region 3, General Services Administration, Washington 25, D. C.			
Apr. 9	2M-9919R	138 gal	Insecticide DDT 25 per cent emulsion concentrate
Apr. 1	3G-10033R	4750 gal	Paint, resin base emulsion int., in accord. Fed Spec TT P-88A and amend. 1 in 5-gal. pails
Procurement Division, Supply Service, Veterans Administration, Washington 25, D. C.			
Apr. 1	A-103	288 btl 384 btl 1104 btl	Acetic anhydride Hydrochloric acid, 1 lb. USP Hydrochloric acid, 1 lb. USP
Federal Prison Industries, Inc., U.S. Penitentiary, Terre Haute, Indiana.			
Apr. 1	31P1-380	29250 lbs	Acid: acetic or hydroxyacetic, 70% grade, or lesser grade down to 56% with proportionate increase

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Blender—Stainless Steel, double cone, 20 drum has internal steam jacket. Kaplan Metals Co., Tioga & Edgemont Sts., Phila., Pa.

Blender, Tumbling Type, 5'x5', type 347 S.S. Equipment Clearing House, 289—10 St., Bklyn.

Calenders, New Rubber Calenders, 6x12", Johnson joints, 7½ HP motor, Complete. Eagle Industries, 110 Washington St., NYC.

Centrifugals, Bird Rubber Covered. First Machinery Corp., 157 Hudson St., N.Y. 13, N.Y.

Centrifuge; Sharples Super S/S. First Machinery Corp., 157 Hudson St., N. Y. 13.

Column Copper—78" x 35'. Kaplan Metals Co., Tioga & Edgemont Sts., Phila., Pa.

Condensers, Coil, St. St., 40 sq. ft. Perry Equip., 1415 N. 6th St., Phila. 22, Pa.

Cutter #2½, Ball & Jewell, Kaplan Metals Co., Tioga & Edgemont Sts., Phila., Pa.

Decanter, Sharples Super-D, s/s type 316, w/10 HP XP Motor. Chemical & Process Machinery Corp., 146 Grand St., New York 13, N.Y.

Disintegrator, Rietz 18 S/S; 30 H.P. First Machinery Corp., 157 Hudson St., N. Y. 13.

Dryer; Double Drum; 28" x 5'. First Machinery Corp., 157 Hudson St., N. Y. 13.

Dryer, Vacuum shelf, 20 shelves, 59 x 78", pump, condenser, 3. Consolidated Products, 18 Park Row, N.Y. 38.

Dryer, Vacuum Shelf, 44"x44" shelves, MD pumps, complete. Eagle Industries, 110 Washington St., NYC.

Dryers, Stainless Drum 5'x10'. First Machinery Corp., 157 Hudson St., N.Y. 13, N.Y.

Filter Alsop, SD-12-NR-30, T316, ST. ST. Perry Equipment Co., 1415 N. 6th St., Phila. 22, Pa.

Filter, Klein stainless steel 100 sq. ft. Chemical & Process Machinery Corp., 146 Grand Street, New York 13, New York.

Filter Oliver, 6'x3' dry salt type. Kaplan Metals Co., Tioga & Edgemont Sts., Phila., Pa.

Filter, Sweetland #5, 29 leaves. Perry Equip. 1415 N. 6th St., Phila. 22, Pa.

Filter Press, 30"x30", aluminum, 45 chambers, Consolidated Products, 18 Park Row, N. Y. 38.

Filter Press, 30"x30", iron, Shriver and Johnson, 35-40 chambers, 6. Consolidated Products, 18 Park Row, N. Y. 38 BArclay 7-0600.

Kettles, Dopp C.I. 200 to 650 gal. First Machinery Corp., 157 Hudson St., N.Y. 13.

Kettle, Reaction, 12 gal. inconel, jktd. & Agit. Perry Equip., 1415 N. 6th St., Phila. 22.

Kettles, S/S, 300 gal. and 200 gal., 100#, WP. Consolidated Products, 18 Park Row, N.Y. 38.

Mill, Ball Hardinge 4½'x2'. Perry Equipment Co., 1415 N. 6th St., Phila. 22, Pa.

Mill, Pebble, 32"x36", Porc. lined. Perry Equipment Co., 1415 N. 6th St., Phila. 22, Pa.

Mill, New Rubber Mills, 6x12, 6x14, 6x16"; Johnson Joints, Complete. Eagle Industries, 110 Washington St., N.Y.C.

Mixer, Lab BP Vacuum, 7½ gal, jktd, MD, Complete. Eagle Industries, 110 Washington St., NY.

Mixers, AMF, Glen, 340 qt., 160 qt. & 120 qt., S/S bowls & beaters, AC motors, 4. Consolidated Products, 18 Park Row, N.Y. 38.

Pebble Mills; 8'x8', Porcelain lined. First Machinery Corp., 157 Hudson St., N.Y. 13, N.Y.

Pebble Mills 10 gal. to 800 gal., porcelain lined, 20. Consolidated Products, 18 Park Row, New York 38.

Pumps, Stokes High Vacuum, 212C, Water cooled, 100 CFM, unused, guaranteed, limited quantity, reasonable prices. American Sales Co., 67 E. 8th St., NYC. GR 3-1465.

Tablet Press, Stokes R, single punch, Consolidated Products, 18 Park Row, N.Y. 38.

Tank. New 20,000 Gal. Cap. 5/16 Steel 6 available. L. M. Stanhope, Rosemont, Pa.

Tank, S/S, 3,000 gal. for truck. Perry Equipment, 1415 N. 6th St., Phila. 22, Pa.

Tank, 5700 gal., S/S, Horiz., New. Perry Equip., 1415 N. 6th St., Phila. 22, Pa.

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Tanks—3000 gallon, Stainless Steel Trailers. Kaplan Metals Co., Tioga & Edgemont Sts., Phila., Pa.

Tanks, 6500 gal. capacity, steel storage, recovered from dismantled tank cars, coiled & non-coiled. Marshall Railway Equipment Corp., 50 Church St., N.Y. 7, N.Y.

Tanks, SS, from 180-10000 gal, jktd. storage, agtd. Eagle Industries, 110 Washington St., NYC.

Vacuum Reactors, 2500 gallon steel agitated closed. Chemical & Process Machinery Corp., 146 Grand St., New York 13, N.Y.

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BOOKLETS . . . . . .

Chemicals

Detergents

24-p. brochure devoted to detergents "D-40" and "D-60," sodium alkyl aryl sulfonates derived from a petroleum-based hydrocarbon, affords information on specifications and tests, properties, uses and applications, in addition to graphical data on wool detergency, cotton detergency, foaming properties, wetting times, etc. Oronite Chemical Co., 38 Sansome St., San Francisco, Calif.

Peroxygen Compounds

7-p. bulletin entitled, "Modification of Wool by Peroxygen Compounds," explains actual and potential uses of peroxygen compounds in four types of wool processing. Buffalo-Electro-Chemical Co., Inc., Buffalo, N.Y.

Surface-Active Agents

4-p. bulletin describing "Nonisols," nonionic surface-active agents of the polyoxyalkylene fatty ester type, and their applications in agriculture, fuel oils, metal processing, plastics, textiles, paints. Alrose Chemical Co., Providence, Rhode Island.

Lindane

Service bulletin, "Insect Control on Crops, Shrubs and Trees with Lindane," lists in chart form host plant, insects to be controlled, recommended concentrations and suggestions for application. Pennsalt Chemicals, 1000 Widener Bldg., Philadelphia, Pa.

Fuel Oils

Folder dealing with problems involved in the burning of modern fuel oils and the application of additives. E. F. Drew & Co., Inc., 15 East 26th St., New York, N.Y.

Equipment

Fans and Blowers

Catalog describing 30 fan types in reference to specifications, dimensions, sizes and prices, along with installation diagrams, product photographs, and selection data. Chelsea Fans & Blower Co., Inc., 639 South Ave., Plainfield, N.J.

Plant Stream Analyzer

6-p. bulletin explaining "process control by continuous analysis" by means of infrared absorption, outlines applications, construction, operating characteristics, and specifications of plant stream analyzer. Baird Associates, Inc., 33 University Rd., Cambridge, Mass.

Purifiers

6-p. bulletin containing information on construction and application of firm's small line type purifier used to clean up small pipelines carrying steam, vapors or air. V. D. Anderson Co., 1935 West 96th St., Cleveland, O.

Steam Generator

12-p. booklet discussing operating principle of forced recirculation, single and multiple installations, and general pressure, size and dimension data, in giving details of specific industrial applications of equipment. Clayton Mfg. Co., El Monte, Calif.

Laminated Plastics

20-p. catalog on laminated plastics and their applications, discusses and compares various grades of laminated plastics with reference to general advantages, uses, and mechanical and electrical properties. A section on fabrication is included, plus a supplement which reviews the firm's line of "Insurok" molded plastics and special plastic materials. The Richardson Co., 2765 Lake St., Melrose Park, Ill.

PICTURES IN THIS ISSUE:

Cover (top) and p. 25 — Lionel Crawford, McGraw-Hill Pub. Co.; Cover (bottom) — Edwood M. Payne; p. 13 — Commonwealth Eng. Co.; p. 29—Michigan State College; p. 31 and 40—Syd Karson, McGraw-Hill Pub. Co.

CHEMICAL WEEK • ADVERTISER'S INDEX • MARCH 29, 1952

AMERICAN-BRITISH CHEMICAL SUPPLIES, INC. 6
Agency—Richard Lewis, Advertising

AMERICAN MINERAL SPIRITS CO. T28
Agency—Leo Burnett Co., Inc.

AMERICAN POTASH & CHEMICAL CORP. T4
Agency—Charles W. Curtis, Advertising

ARCHER, DANIELS, MIDLAND CO. 22
Agency—The Bayless-Kerr Co.

ARKELL & SMITHS 23
Agency—J. Hayden Twiss, Adv.

ARNOLD-HOFFMAN & CO., INC. B50
Agency—George T. Metcalf Co.

ASHCRAFT-WILKINSON CO. 36
Agency—Liller, Neal & Battle, Advertising

BAKER CHEMICAL CO., J. T. 30
Agency—Wildrick & Miller, Inc.

BALTIMORE & OHIO RAILROAD 16
Agency—The Richard A. Foley Advertising Agency, Inc.

CARBIDE & CARBON CHEMICALS CO., A DIVISION OF UNION CARBIDE & CARBON CORP. B28
Agency—J. M. Mathes, Inc.

COMMERCIAL PETROLEUM & TRANSPORT CO. T41
Agency—Laughlin, Wilson, Baxter & Persons, Advertising

COMMERCIAL SOLVENTS CORP. 15
Agency—Fuller & Smith & Ross, Inc.

DAVISON CHEMICAL CORP., THE ..... 3rd Cover
Agency—St. Georges & Keyes, Inc.

EASTMAN KODAK CO. T38
Agency—Charles L. Rumrill & Co., Inc.

EMPIRE TRUST CO. B37

GENERAL CHEMICAL DIVISION, ALLIED CHEMICAL & DYE CORP. ..... Back Cover
Agency—Atherton & Currier, Inc.

GRAVER TANK & MFG. CO., INC. 3
Agency—Simmonds & Simmonds, Inc.

HALL CO., THE C. P. 2
Agency—Cruttenden & Eger, Advertising

HARDESTY CHEMICAL CO., INC. 1
Agency—Terrill, Belknap, Marsh Associates

HARTE CO., JOHN J. 19
Agency—Mozley, George & Woollen, Advertising

HERCULES POWDER CO. 34
Agency—Fuller & Smith & Ross, Inc.

JEFFERSON CHEMICAL CO. 29
Agency—Hazard Advertising Co.

KEIDING PAPER PRODUCTS CO. T50
Agency—Morrison Advertising Agency, Inc.

KOPPERS CO., INC. B41
Agency—Batten, Barton, Durstine & Osborn, Inc.

MALLINCKRODT CHEMICAL WORKS 27
Agency—The Philip Ritter Co., Inc.

METALLOY CORP. B20
Agency—F. H. Faber, Advertising

MIXING EQUIPMENT CO., INC. 31
Agency—Charles L. Rumrill & Co., Inc.

NEVILLE CO., THE 33
Agency—Advertising Agency of William Cohen

NOPCO CHEMICAL CO. 32
Agency—Lewin, Williams & Saylor, Inc.

NORFOLK & WESTERN RAILWAY 5
Agency—Houck & Co.

OKLAHOMA PLANNING & RESOURCES BOARD 49
Agency—White Advertising Agency

PACIFIC COAST BORAX CO. T37
Agency—Howard M. Irwin & Associates

PITTSBURGH COKE & CHEMICAL CO. 21
Agency—Walker & Downing, Advertising

PLAX CORPORATION 43
Agency—The Charles Brunelle Co.

POWELL CO., WM. 44
Agency—Associated Advertising Agcy., Inc.

PRESSED STEEL TANK CO. 24
Agency—The Buchen Co.

RICHES-NELSON, INC. B4
Agency—Givaudan Adv., Inc.

SINDAR CORPORATION B18
Agency—Hazard Advertising Co.

SOLVAY SALES DIVISION, ALLIED CHEMICAL & DYE CORP. ..... 2nd Cover
Agency—Atherton & Currier, Inc.

UNION CARBIDE & CARBON CORP., CARBIDE & CARBON CHEMICALS CO. B28
Agency—J. M. Mathes, Inc.

U.S. INDUSTRIAL CHEMICALS, INC. 9-10
Agency—G. M. Basford Co.

U.S. POTASH CO. B38
Agency—McCann-Erickson, Inc.

U.S. TESTING CO., INC. 17
Agency—Robert B. Grady Co., Adv.

WATEROUS COMPANY T18
Agency—F. H. Faber, Advertising

WELCH, HOLME & CLARK CO., INC. T20
Agency—Byrde, Richard & Pound

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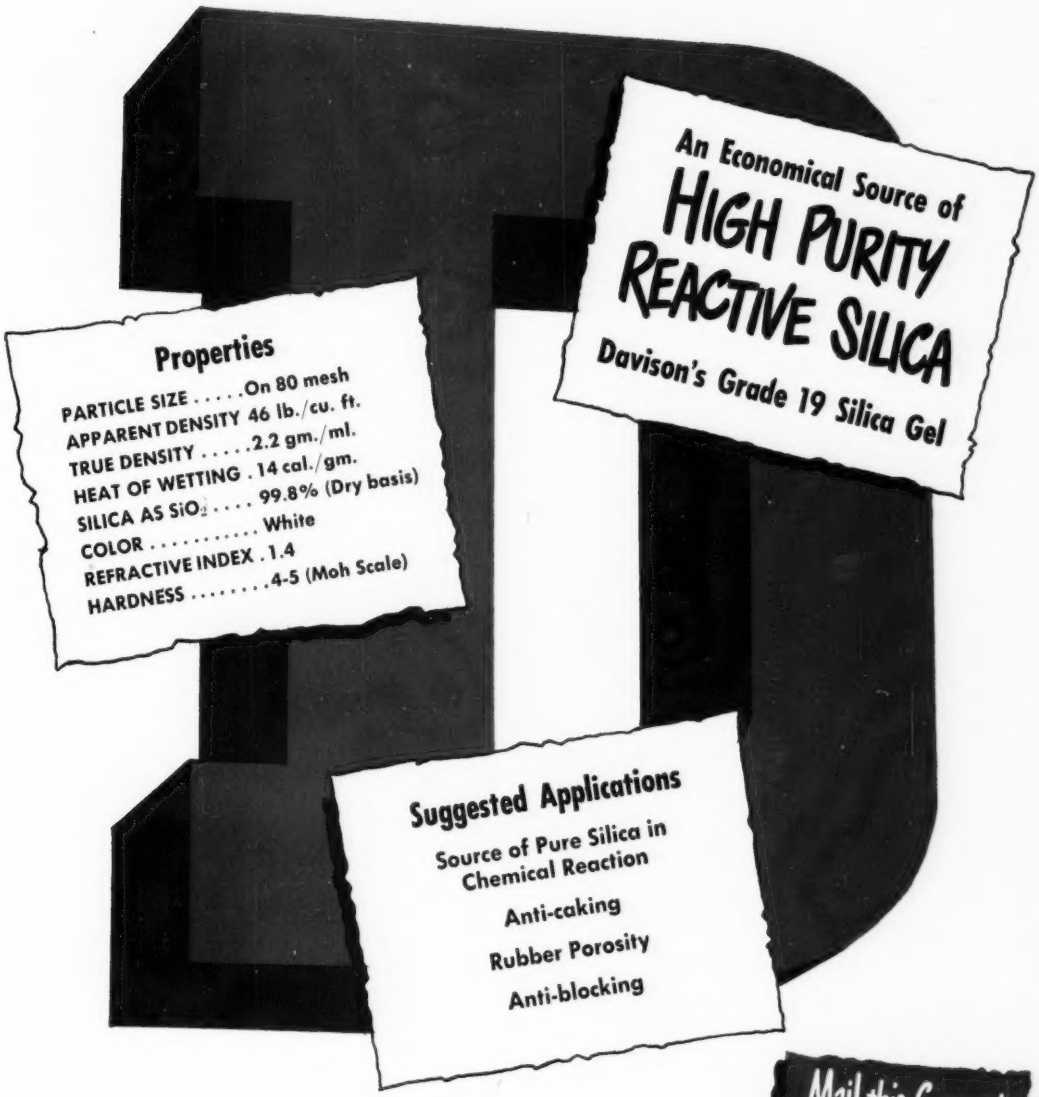

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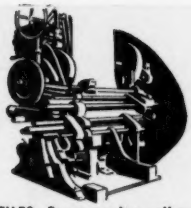
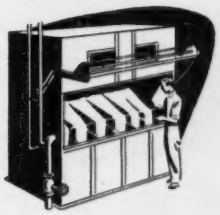
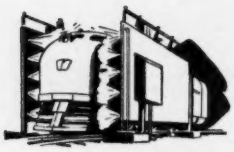


TEXTILES—For removing soil or smears after black aniline printing; in development of color when printing; for removing rust stains



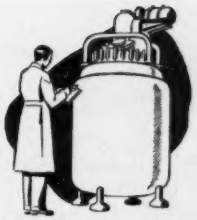
DYES—In manufacture of dyes

for these or other uses...



CLEANERS—For cleaning rust from railroad cars and buses; also as an auto radiator cleaner

PENTAERYTHRITOL — In manufacture of pentaerythritol, used in making surface coating resins and explosives



CHEMICALS—For manufacturing oxalates and other chemicals

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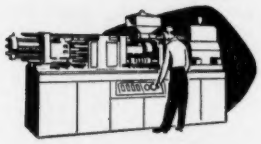
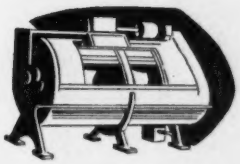


PLASTICS—As a polymerization catalyst or decoloring agent



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